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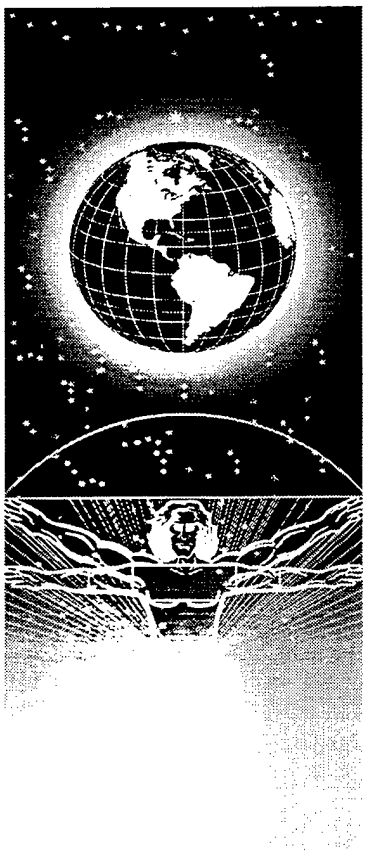

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LOGISTICS SURVEY

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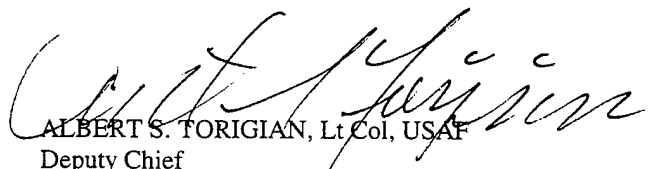

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PREFACE

This report documents the results of a study to develop and evaluate techniques to use web based technology to perform a survey requirements for research in Air Force logistics processes. The study also surveyed personnel working in the Air Force supply system to solicit their inputs for use in defining research needs in the area of supply.

The study was performed by TASC, Inc. and Logicon Technical Services, Inc. (subcontractor to TASC) for the Air Force Research Laboratory's Deployment and Sustainment Division. Ms. Cheryl Batchelor in AFRL/HESR was the Laboratory Task Manager.

The study could not have been accomplished with out the support and assistance of Colonel, John H Gunselman, Jr., AF/ILSP; Mr. Don Watson, 20th Supply Squadron, Shaw AFB, SC; Lt. Col. Leonard Petrucelli, HQ AETC; and SMgt. Raymond E. Heath, AFSC/LGS. Their support was a major factor in the success of the study.

SUMMARY

This study had two objectives: (1) develop and evaluate web based tools for use in surveying Air Force logisticians to identify logistics research requirements; and (2) apply those tools to survey personnel working in the Air Force supply system to identify opportunities for research to improve the efficiency of the systems to support Air Force operations. Several web based tools were evaluated. Raeosoft's EZSurvey was selected. Questions were developed to elicit information on the current supply processes and identify opportunities for improvement. The questions were structured in a branching format so that respondents were presented with only those questions appropriate for their status (military, civilian), experience level, specialties, and duties. The survey proved to be an effective tool for identifying opportunities for research to develop better tools and develop improved processes to improve the capability of the Air Force to support operations.

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Acronyms

ACC	Air Combat Command
ACS	Agile Combat Support
ADC	Automatic Data Collection
AEF	Air Expeditionary Force
AFEMS	Air Force Equipment Management System
AFLMA	Air Force Logistics Management Agency
AFMC	Air Force Materiel Command
AFRL/HES	Air Force Research Laboratory Human Effectiveness Deployment and Sustainment Division
ASNUD	Automated Stock Number User Directory
ATG	Automatic Tank Gauging
BCAS	Base Contracting Administration System
CDC	Career Development Course
CMOS	Cargo Movement Operations System
CSS	Combat Supply Support
DIREP	Discrepancy Report
DLR	Depot Level Repairable
DMAS	Dynametrics Microcomputer Analysis System
DMHMMS	Depot Maintenance Hazardous Material Management System
DRMO	Defense Reutilization and Marketing Office
FAS	Fuels Automated System
FEDEX	Federal Express, Inc.
FEDLOG	Federal Logistics Data
FMSE	Fuels Mobility Support Equipment
GUI	Graphical User Interface
HAZMAT	Hazardous Material
HTML	Hyper Text Markup Language
ILS-S	Integrated Logistics System-Supply
IMDS	Integrated Maintenance Data System
IMPAC	International Merchant Purchase Authorization Card
ITI-ALC	Integrated Technical Information for the Air Logistics Centers
ITV	In-Transit Visibility
JSF	Joint Strike Fighter
MICAP	Mission Capable
MRSP	Mobility Readiness Spares Package
MSDS	Material Safety Data Sheet
O&ST	Order and Ship Times
OBOGS	On-Board Oxygen Generating System
OJT	On-the-Job Training
RBL	Readiness Based Leveling
RSP	Readiness Spares Kit
SAFB	Shaw Air Force Base, South Carolina

SATS	Supply Automated Tracking System
SBSS	Standard Base Supply System
SME	Subject Matter Expert
SOW	Statement of Work
TAV	Total Asset Visibility
UPS	United Parcel Service
URL	Universal Resource Locator
WAPS	Weighted Airman Promotion System
WinMASS	Windows Mission Capable Asset Sourcing System
WPAFB	Wright-Patterson Air Force Base, Ohio
WWW	Worldwide Web

Logistics Survey

1. EXECUTIVE SUMMARY

The Deployment and Sustainment Division of the Air Force Research Laboratory's Human Effectiveness Directorate has wanted for some time to reach logistics personnel at the working level for input on where logistics research should be concentrated to achieve maximum benefit. A survey of the logistics community was considered several times in past years, but such an undertaking by interviews, visits and paper methods was deemed impractical. However, with the recent availability of survey software packages, and increasingly easy access to the Worldwide Web (WWW), the Lab revisited the idea. It was decided that a survey could be developed and administered through the Web and that it would be focused on the supply (including fuels) functional area. This effort was established to (1) develop the necessary survey procedures; (2) apply them to a selected logistics area; (3) develop research requirements from the data collected; (4) evaluate the survey process; and (5) identify refinements to the procedures for use in surveying other logistics areas. Supply was selected as a focus for this first survey because it touches virtually every aspect of the Air Force mission. The Logistics Survey effort began in September 1998 and the survey itself was deployed the following spring.

Development of the survey questions was an iterative process that began with a series of interviews with logistics Subject Matter Experts (SMEs). The interviews produced a list of issues and concerns around which specific questions were developed. Once drafted, the survey was reviewed and approved by the Survey Branch at the Air Force Personnel Center.

One of the more difficult facets of the whole effort was determining what the minimum survey software requirements should be. After an exhaustive effort, it was decided that software requirements would fall into five categories:

- Implementation

  Implementation was defined as the method used to present the survey. The software must provide a web-based option; however, additional methods for hosting the survey were considered (i.e. e-mail, survey by disk {Windows or DOS based}, Intranet, and paper). The software's capability to interactively manage large numbers of concurrent users was also a required feature.

- Question Structure

  Question structure encompassed both response options and branching. Several response types such as single and multiple choice, check all that apply, rank order, text write-in, and combination response (choice with optional comment) were necessary to assure flexibility in question design. Response branching enabled only relevant questions to be presented to the participants. Additionally, the survey's interface had to be aesthetically pleasing and efficient in order to portray a professional image, thus encouraging thoughtful, thorough responses.

- Statistics

  Statistical analysis features desired were subjective response evaluation, descriptive statistics (mean, mode, standard deviation), graphs and charts, and response weighting. Preliminary research indicated many software packages did not provide subjective response evaluations. However, if a subjective response evaluation was provided it was simply a keyword search; therefore, it was anticipated that the subjective responses would be analyzed manually.

- Database

  The database had to be structured in a common format to allow for multiple storage formats, expandability, accessibility, and the ability to easily manipulate data. The database also had to allow for the import or export of new or existing records. Sorting and weighting capabilities were also necessary.

- General

  Finally, general software feature requirements included developer usability, user help, and cost.

Through an extensive search of the literature and the Internet, survey software packages from twenty-four manufacturers were identified for evaluation. An evaluation matrix was created to evaluate which packages offered the capabilities set forth in the five requirement categories. The categories were weighted equally at 20 percent. After each reviewer assessed a package's capability to meet the requirements in each category, a final rating was assigned.

Initial analysis reduced the field to 14 packages, primarily because some of the products did not support HTML and others were not stand-alone products. Ratings of those 14 ranged from a top score of 100 to a low of 40. The top four products were selected for testing. Those were Decisive Technology's Decisive Survey and Raosoft's EZSurvey, both of which scored a 100, and Survey Select and Training Technology's Survey Tracker which each earned the next highest score of 80. A prototype survey was created to facilitate in-depth analysis of the packages. Critical factors in the testing were the operating system from which the survey could be hosted, the ability to display a set of questions on a single HTML page (branching), the capability to modify question and response types,

and finally cost. Working independently, two reviewers evaluated each of the four software packages and a software score sheet was completed for each package. Raosoft's EZSurvey was selected.

Development of survey questions began with an extensive literature search and conversations with logistics SMEs to identify high-level topic areas. Two organizations, the 88th Supply and Transportation Group at Wright-Patterson Air Force Base (WPAFB), Ohio and the 20th Supply Squadron at Shaw Air Force Base (SAFB), South Carolina, were identified to provide information for development of the specific survey questions.

Twelve sections were defined to categorize and organize the question development and survey branching:

- Demographics
- Contractor
- Military
- Civilian
- Deployment
- Training
- Main
- Information Systems
- Fuels
- Supply
- Computers
- Hazardous Material (HAZMAT)

Each of these sections varied in level of content extraction. For instance, the demographics, deployment, training, main, information systems, and HAZMAT sections were presented to every participant and were rather general. On the other hand, the contractor, military, civilian, fuels, supply, and computer sections were more specific and only presented to participants when relevant. A series of questions were asked about the participant's background and specialization in order to assess which sections of the survey were to be presented to that particular participant. This allowed survey length to remain reasonably short (the sections contained anywhere from 1 to 14 questions). The total number of questions presented to a participant depended on that participant's specialization.

When the questions were drafted, they were entered into Raosoft's EZSurvey software and the resulting web-based survey was distributed for beta testing of the branching, question content and overall appearance. Several bugs and some content inaccuracies were identified, as was the need for

revisions in question order and organization. The beta test was completed in two weeks. After a short period to fix the deficiencies identified in the beta test, the survey was deployed to the Web.

A combination of objective and subjective questions were asked to capture all aspects of the supply/fuel functional area. The responses from these two question types were analyzed separately. A total of 118 questions were asked. Of these questions, 81 were objective (basically multiple choice), 9 were subjective (allowed free input from the participant) and the remaining 28 were a combination of both objective and subjective styles (combination questions).

Once all the responses had been collected and downloaded from the server they were run through the analysis software resident in EZSurvey, which automatically tabulated the objective question responses. Due to limitations of the software, responses to the subjective and combination questions were exported and analyzed manually.

The survey results were assessed within the context of five areas/themes:

- Information System Capabilities
- Policies, Procedures, and Training
- Deployment Support
- Asset Visibility
- Other Significant Results

Survey results clearly showed that information systems are vital for supply organizations to operate, with 87 percent stating that they needed computers, the Internet, or networks to do their jobs. Problems included lack of communication between systems, interfaces that do not operate properly, supply personnel having to develop custom programs to meet customer needs, and frequent need for work-arounds to get the job done. On the other hand, new systems such as the Automatic Tank Gauging (ATG) system were highly regarded by the respondents.

Under Policies, Procedures, and Training, 20 percent felt consolidation of supply and transportation would result in problems with training and career progression resulting in a career field consisting of a group of generalists rather than functional experts. In addition, suggestions were made to take the turn-in process out of supply and allow maintenance people to requisition parts directly from the source, rather than through supply. Training generally received positive comments.

The survey clearly indicated that better computer equipment, faster setup, and more reliable connectivity would enhance deployment support. Equipment used on deployments was reported as either "worse" or "much worse" than at home station by 51 percent of those responding.

When asked about potential problems for the Air Expeditionary Force, 26 percent reported that there are too few people to adequately support the concept. Survey comments further showed that supply personnel need deployment kits similar to those in aircraft maintenance if they are to support demanding AEF requirements. Likewise, it was noted that deployed locations need to build detailed continuity folders so that the site-specific knowledge is not lost when deployed personnel rotate.

While the Mobility Readiness Spares Packages (MRSPs) received good reviews, there were clear indications of severe problems with Fuels Mobility Support Equipment (FMSE).

The survey indicated that local contractors play a relatively significant role at deployed locations and that quality problems appeared to be rather prevalent. For example, 54 percent said they had quality problems with contractor provided aircraft fuel.

Survey comments indicated significant deficiencies in TAV capabilities at a time when AEF and ACS require reliable TAV more than ever before.

Lastly, references to supply trying to do the same work with fewer people, but not performing as well as before; complaints about redundant and non-value-added work; and several references to outdated processes were unmistakable indications of a need for a bottom up reengineering of supply.

Assessment of the survey results identified requirements for further research and study in the following areas:

- TAV
- FMSE
- Cryogenic equipment
- Supply work-arounds
- Integration of logistics systems
- Deployment training and continuity

The specifics are discussed in detail in the Potential Research and Study Areas section (5.6) of this report.

In Section 6, lessons learned in software, survey response rate, and help desk are discussed.

In conclusion the survey successfully accessed some of the problems and opinions the working level logistics personnel and provided an avenue to extract information from the end users of logistics systems and process. This key capability will allow the definition of the research areas that truly affect the logistics personnel in the field in a very cost effective manner and will provide a medium that will foster and frank and truthful response than face to face interviews. The time for the data collection was shortened over traditional methods and the overall cost decrease and increase in diversity of the respondents are improvements over past survey procedures.

2. INTRODUCTION

2.1 BACKGROUND

In its continuing effort to provide research and development support to the Air Force logistics community, the Deployment and Sustainment Division of the Air Force Research Laboratory's Human Effectiveness Directorate, through its Logistics Readiness and Sustainment Logistics Branches, is consistently seeking new and innovative ways to identify areas where research might assist in identifying key logistics problems.

For some time, there has been a desire on the part of the Deployment and Sustainment Division to survey Air Force logisticians to get input on current practices in order for the Lab to focus on areas where there is a significant and documentable need for improvement. However, until recently, performing a survey of a group as large and diverse as logisticians was deemed impractical. The conventional means of conducting a survey (i.e., mailing a survey, having people fill it out and return it) involved a considerable administrative burden in the preparation and distribution of the survey and in organizing, analyzing, and reporting the results. Merely getting a statistically valid sample of respondents was considered unlikely because of the time required to fill out and return a paper survey.

With recent advances in technology, such as the availability of survey software packages and increasingly easy access to the Worldwide Web (WWW), the Lab revisited the idea of surveying the logistics community. If a survey could be electronically generated, hosted and completed on the WWW, and if the results could then be electronically gathered and organized to facilitate a thorough analysis, then such a survey would be practical.

In the summer of 1998, the Logistics Readiness Branch (AFRL/HESR) made the decision to proceed with a worldwide survey of logisticians (specifically, supply personnel). A statement of work (SOW) was written, calling for an effort to identify and assemble the appropriate tools and to bring together the technical and functional expertise necessary, to build the survey and administer it through the WWW. Litton-TASC, with their subcontractor Logicon, was contracted to assist in the effort. Scope

Air Force logistics consist of aircraft maintenance and munitions, supply, transportation, logistics plans, and contracting. Although medical and space organizations also have logistics functions, they have their own funding and reporting channels that are separate from the five traditional logistics functional areas. Because there are over 120,000 logistics personnel in the Air Force, the Lab felt it appropriate to narrow the focus of this first survey to a manageable subset of the logistics community.

The decision was made to target supply, which includes fuels. With approximately 13,891 supply/fuels people (13,250 enlisted and 641 officers) assigned Air Force wide, supply represented a reasonable cross section of the Air Force logistics community. These numbers are military people only and do not include Department of the Air Force civilians and contractors; however, some civilians and contractors did respond to the survey.

Another factor in selecting supply, was that its functional area was in a state of flux with the inception of the Air Expeditionary Force (AEF) and other changes taking place. The AEF concept requires expeditionary units to deploy with the leanest package ever, consisting of only a seven-day supply of unique aircraft parts. Therefore, immediately upon arrival at a deployed site, resupply procedures must be established to facilitate the flow of supplies. This is accomplished through Agile Combat Support (ACS).

ACS, one of the Air Force's six core competencies, includes (in addition to reduced inventories) global reach-back efficiency and rapid time-definite delivery, from installations in and outside the continental United States to flight lines at deployed locations around the world. This change in the operational concept profoundly affects supply, especially with outsourcing initiatives and regionalization taking place nearly the same time. Given these circumstances along with the fact that supply touches, in some way, nearly every aspect of the Air Force mission, it was believed that the opportunity for identifying innovative research opportunities would be greatest in supply.

As with all surveys, the larger the sample size (number of respondents) the more powerful the results. Through implementing a WWW-based survey, the capacity and opportunity to reach a major portion of the supply/fuels community became possible.

2.2 OBJECTIVES

The overall thrust of this project was to successfully conduct a WWW-based survey that captured current concerns and issues within the Air Force logistics community. To do that and make the effort worthwhile, the Lab had three objectives in mind.

The first objective was to establish a methodology for the creation and deployment of a WWW-based survey along with the definition of data collection techniques. With that objective achieved, the next was to narrow the effort and center it on the supply/fuels functional area and capture current concerns and issues within that community. The last objective was to organize and analyze the issues and concerns that were collected, with the goal in mind of identifying potential research areas. If these objectives could be achieved, future research efforts could be initiated based on current, real world mission needs.

3. APPROACH

After the scope and objective of the survey were defined, selection of a survey tool and development of the content began. The technical mechanics required to host a web-based survey were researched. The first step was to define the software requirements and then identify and evaluate candidate software packages. If a package met all of the requirements, it was further evaluated and tested with regard to feature functionality.

Content development was an iterative process that facilitated question creation and validation. A series of interviews were conducted to elicit general and specific comments regarding concerns and issues from logistic Subject Matter Experts (SMEs). Information gained from these interviews was used as the basis for developing items for the questionnaire. After validation of the questions, the survey was sent to the Survey Branch at the Air Force Personnel Center, which granted approval with survey control number USAF SCN 99-16.

3.1 SURVEY TOOL SELECTION

The selection of a survey tool centered on identifying software requirements, establishing an identification and evaluation methodology, and defining software-testing criteria. Through adhering to the established methodologies and testing criteria, the selected software was assured to have met all of the requirements.

3.1.1 Software Requirements Definition

Software under consideration had to meet minimum requirements for the current project and some limited requirements for future survey projects. These requirements were grouped into five categories:

- Implementation - Defined as the method used to host the survey. The software must provide a web-based option; however, additional methods for hosting the survey were considered (i.e., e-mail, survey by disk (Windows or DOS based), Intranet, and paper) The software's capability to capture and manage large numbers of concurrent users was also a required feature.
- Question Structure - Encompassed both response options and branching. Several response types such as single and multiple choice, check all that apply, rank order, text write-in, and combination response (choice with optional comment) were necessary to assure flexibility in question design. Response branching provided a means of

presenting each individual with only those questions relevant to him or her. Additionally, the survey's interface had to be aesthetically pleasing and efficient in order to portray a professional image, thus encouraging thoughtful, thorough responses.

- Statistics - Statistical analyses desired were subjective response evaluation, descriptive statistics (mean, mode, standard deviation), graphs and charts, and response weighting. Preliminary research indicated that many software packages did not provide subjective response evaluations. However, if a subjective response evaluation was provided it was simply a keyword search. Therefore, it was anticipated that the subjective responses would be analyzed manually.
- Database - The database had to be structured in a common format to allow for multiple storage formats, expandability, accessibility, and ability to easily manipulate data. The database also had to allow for the import or export of new or existing records. Sorting and weighting capabilities were also necessary.
- General - General software feature requirements included developer usability, user help, and cost.

These five categories represented the required functionality of a survey software package. See Appendix B for a detailed listing of the requirements.

3.1.2 Software Identification/Evaluation

Survey software packages from twenty-four manufacturers were collected and evaluated. Those packages were identified through an exhaustive search of the literature and the Internet. It was found that almost every candidate offering a web-based survey capability had a presence on the Internet. Most manufacturers offered an on-line demo or a free trial copy. This open availability allowed for a rather extensive analysis of every package.

An evaluation matrix was created to identify which packages exceeded or lacked capability in the required categories (Appendix C). The twenty-four candidates were evaluated based on the number of requirements met. The five requirement categories (implementation, questionnaire design, statistical capabilities, database, and other features) were weighted equally at 20 percent. After each reviewer assessed a package's capability to meet the requirements in each category, a final rating was assigned.

Upon initial analysis, eight packages were disqualified from further review because they were either not stand-alone packages (i.e., required additional software to function) or there was insufficient

information available. Additionally, two packages scored zero because they did not support HTML. Figure 1 shows the final ratings for the remaining fourteen software packages.

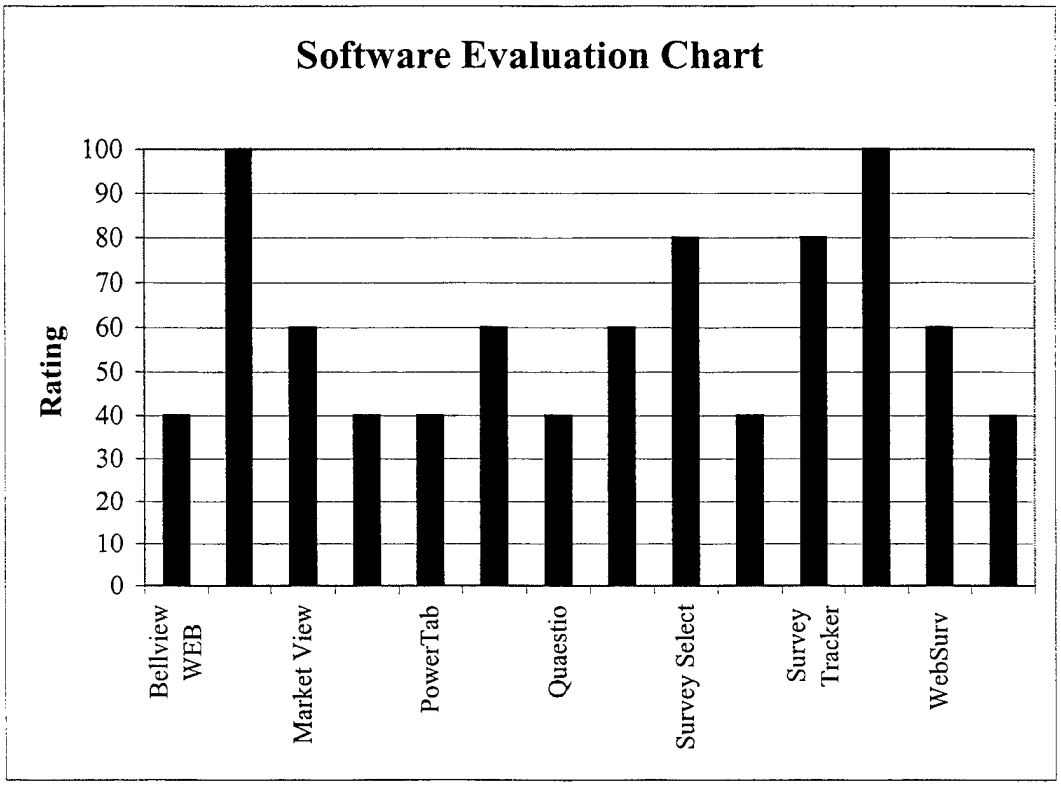


Figure 1- Software Evaluation Chart

The ratings ranged from a top score of 100 to a low of 40. Both Decisive Technology's Decisive Survey and Raosoft's SURVEYWin scored a 100. Survey Select and Training Technology's Survey Tracker earned the next highest score of 80. These four packages warranted further evaluation.

3.1.3 Software Selection

The four software candidates (Decisive Survey, SURVEYWin, Survey Select, and Survey Tracker) selected for an additional review, were then evaluated against a more discriminating set of criteria. A fully operational or, at the very least, demonstration version of the software was loaded to display and test functionality. Working independently, two reviewers evaluated each of the four software packages. Prototype surveys were created to facilitate in-depth analysis. A software score sheet was completed for each package (Appendix D).

Upon completion of the four separate score sheets, the two reviewers discussed their findings. Critical factors in the decision were the operating system from which the survey could be hosted, the ability to display a set of questions on a single HTML page (branching), the capability to modify question and response types, and finally, cost.

The critical feature supported by all of the packages was the ability to modify HTML code to enhance the appearance of the page, such as background color and pattern, question and response orientation, font and size, insertion of bitmap images, and branching between pages. However, the four packages did differ in their ability to support some of the other critical factors mentioned above. The ability to branch between HTML pages was the limiting factor for Survey Select. Decisive Survey was eliminated from consideration due to the limited number of question and response types available. Finally, cost was the limiting factor for Survey Tracker. Survey Tracker was approximately three times more expensive than the other three packages and was eliminated as a final candidate. Thus, Raosoft's line of survey software (EZSurvey, WINSurvey, and EZReport) was selected.

3.1.4 Software Features

One of the most beneficial features of Raosoft's software, was the capability to host a web-based survey on various operating systems. For example, a survey launched initially using a Unix-based operating system could later be deployed under a Windows NT environment. Although this feature was not deemed an immediate requirement, it was essential for the success of future projects.

Raosoft also allowed for extensive branching. Through branching, all functional areas could be grouped and only presented when relevant. This provided some customization and shortened the time needed to complete the survey.

Unlimited sample size was another feature of Raosoft that proved invaluable. Often with web-based surveys, as in this case, it is difficult to accurately predict the number of responses. Thus, not having to define an upper boundary was extremely beneficial.

3.2 SURVEY CONTENT DEVELOPMENT

After selecting Raosoft's EZSurvey as the survey software package, development of the survey content began. Since the goal of the survey was to identify potential research areas in Air

Force logistics, content development centered on questions seeking to extract these potential research areas. The content and subsequent questions for the survey were developed through an iterative interview process that allowed for validation and revisions.

Content development began with an extensive literature search and conversations with logistics SMEs to identify high-level topic areas. These topic areas covered a mix of current logistics practices, as well as future issues. The most relevant questions were chosen for the two interview sessions. Appendix E contains the interview script. Two organizations were identified to provide information for the development of the survey questions. These organizations were the 88th Supply and Transportation Group at Wright-Patterson Air Force Base (WPAFB), Ohio, and the 20th Supply Squadron at Shaw Air Force Base (SAFB), South Carolina. The WPAFB unit had recently converted to a contractor operation; however, most of the personnel who participated in the interviews were former military or civil service supply technicians. This group covered the entire spectrum of supply functions at WPAFB, such as warehouse, receiving, pickup and delivery, hazardous material (HAZMAT), and inspection. The SAFB unit provided input regarding the flying operations' portion of supply. The areas of fuels, mobility, and computer support were additionally discussed. SAFB is the lead base for the testing of the Supply Asset Tracking System (SATS) which integrates automatic identification technology into the receiving, storing, processing, and delivery of supplies. Wide ranges of supply issues were discussed between these two organizations.

All interviews were audio taped. The tapes were later transcribed and combined with notes taken during the sessions, and a series of follow-up questions were formulated. These follow-up questions were submitted to the two organizations for elaboration and clarification. After this verification and validation, the process of survey question development began.

3.2.1 Question Development

Analysis of the responses from the organizations at WPAFB and SAFB provided the content and categories from which the final survey questions were based. Twelve sections were defined to categorize and organize the question development and survey branching.

- Demographics
- Contractor
- Military
- Civilian

- Deployment
- Training
- Main
- Information Systems
- Fuels
- Supply
- Computers
- Hazardous Material (HAZMAT)

Each of these sections varied in level of content extraction. For instance, the demographics, deployment, training, main, information systems, and HAZMAT sections were presented to every participant and were rather general, whereas the contractor, military, civilian, fuels, supply and computer sections were more specific and only presented to participants when relevant. A series of questions were asked about the participant's background and specialization in order to assess, which questions were to be presented. These questions also guided the branching flow. How a question was answered, determined the next set of questions. Along with only presenting specialized questions to participants, the branching allowed survey length to remain reasonably short. The sections were organized in series and parallel as seen in the flowchart (Figure 2). The survey began with a short explanation of the study's scope and objectives. The participants were then given the instructions and shown how to use the on-line help. The rectangles in Figure 2 represent sections of questions and the diamonds represent decision points. Depending on which branch was taken from a decision, the appropriate section was entered. The sections contained anywhere from 1 to 14 questions. The total number of questions presented to a participant depended on the participant's specialization.

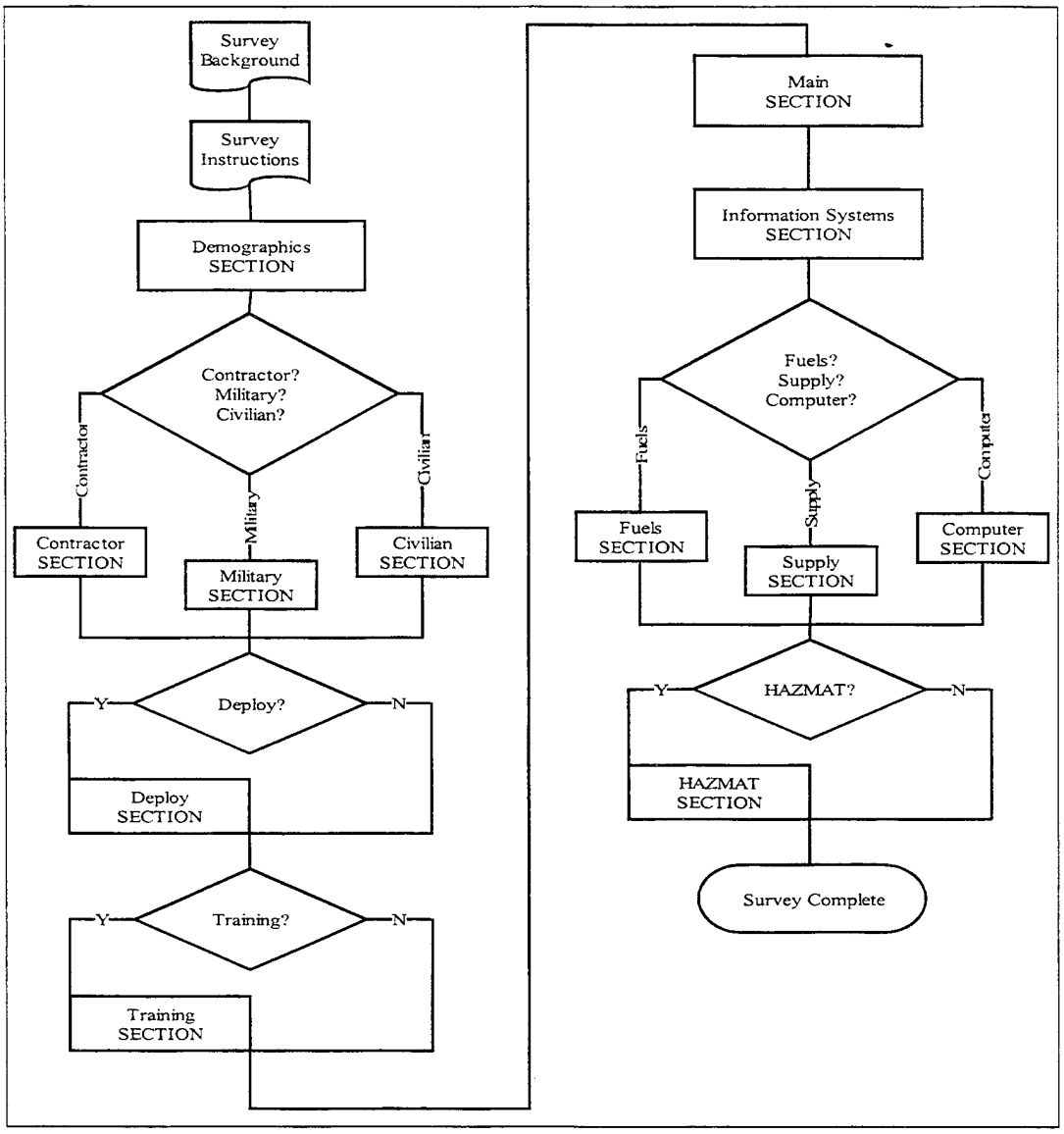


Figure 2 Flowchart of Survey Branching

3.2.2 Question Validation

The were entered into Raosoft's EZSurvey software. The question types were selected, as appropriate for each question. The question response types (i.e., Likert, binary, multiple choice, ordinal, and user-defined) were also selected for each question. The resulting web-based survey was distributed for beta testing of the branching, question content, and overall appearance. The beta test

revealed several bugs in the branching logarithms and data collection formats. In addition, some content inaccuracies were identified, as was the need for revisions in question order and organization. The beta test was two weeks long.

The beta test suggestions were reviewed and incorporated by the development team. The final list of questions, instructions and background information can be found in Appendix F. The web-based survey's graphical user interface can be seen below in the screen shots of the Deployment and Contractor Sections (Figures 3 and 4 respectively).

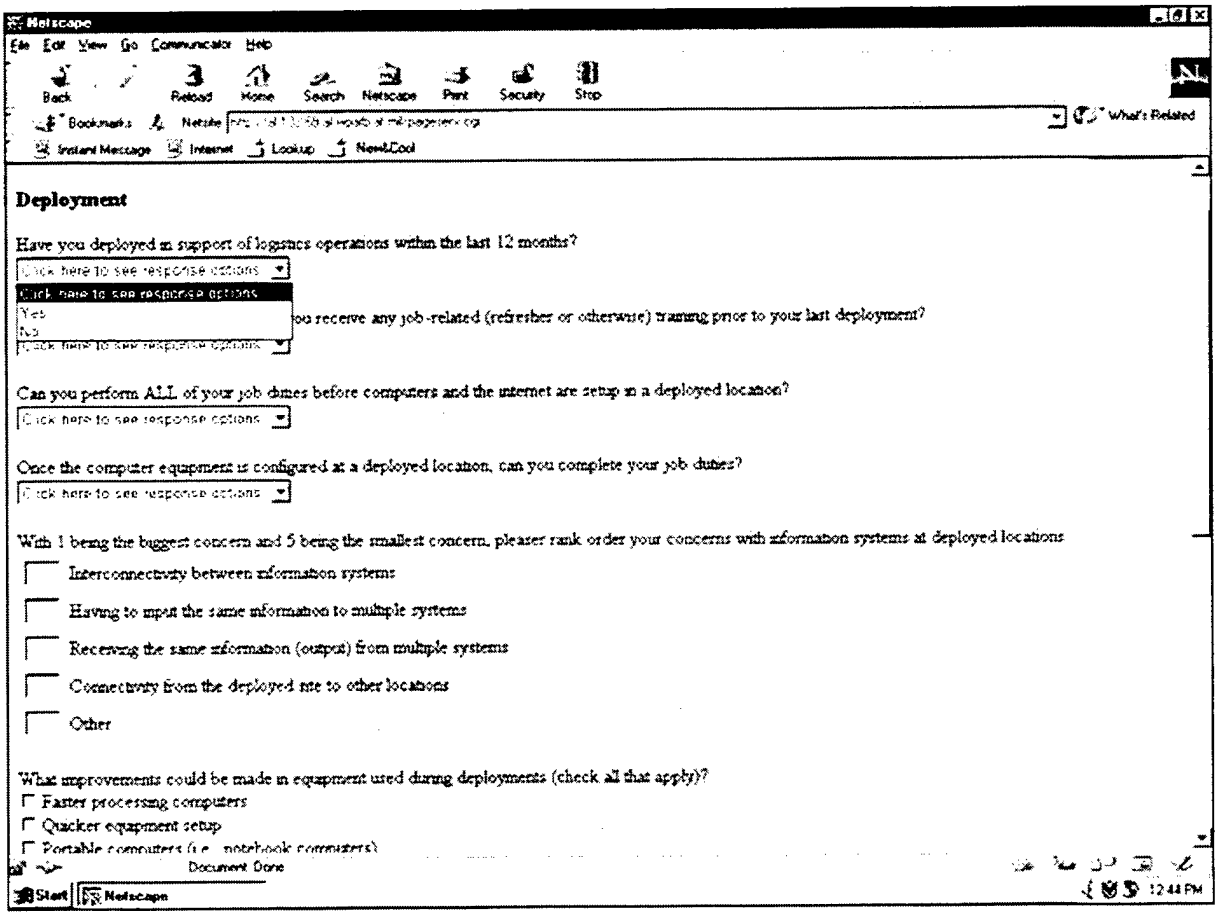


Figure 3 Screen shot of Deployment Section

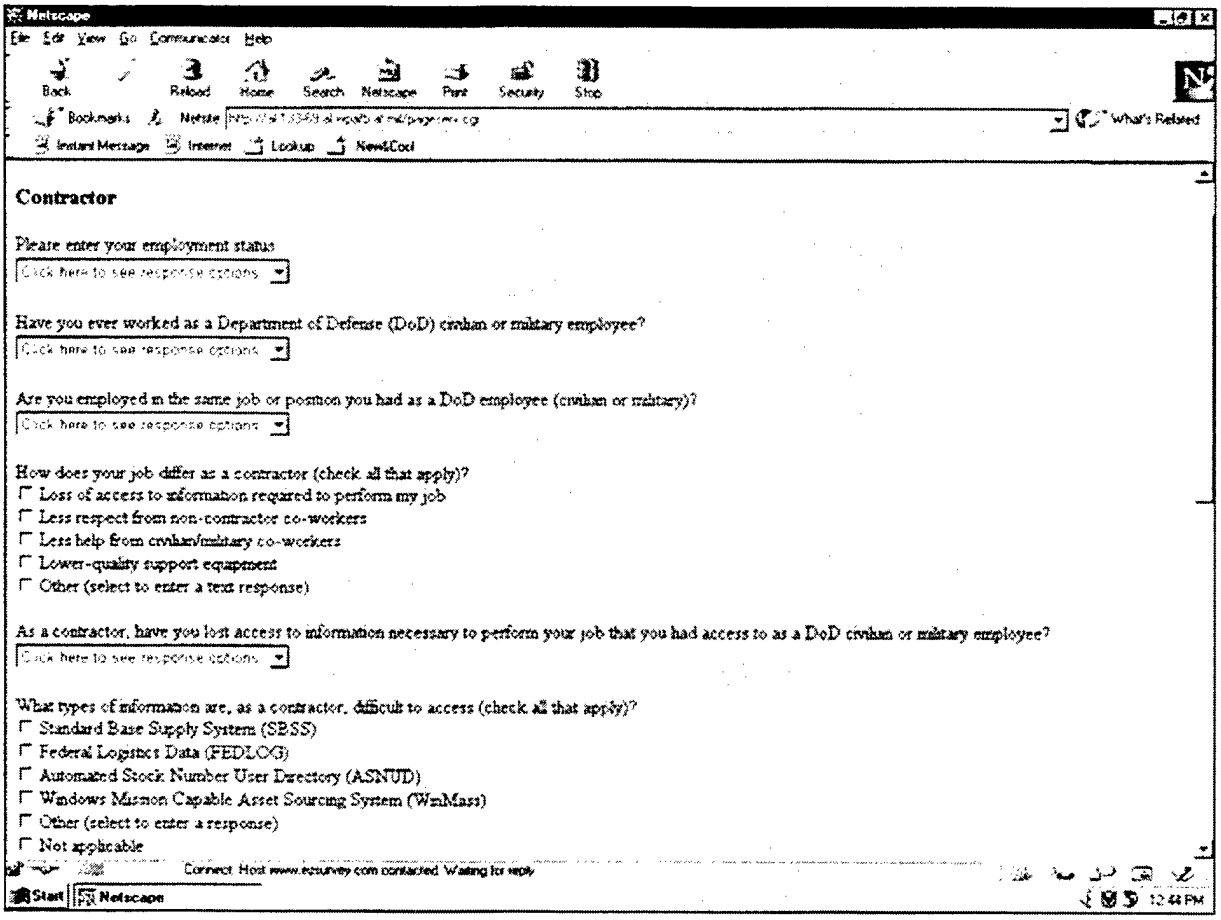


Figure 4 Screen shot of Contractor Section

4. DATA COLLECTION

The only major decision to be made with regard to data collection was to identify the best platform from which to host the survey. Because of the overwhelming access and familiarity of the project team with UNIX, it was selected as the platform of choice. A Sun Netra™ workstation hosted the survey and housed the collected data. Because the collection of data took place on the same system that hosted the survey, the entire data retrieval procedure was very efficient.

4.1 HOSTING ON THE WEB

There are many benefits to hosting a survey on the WWW (e.g., ability to reach a disbursed group of respondants, ease of use, speed in response times, etc.), as well as many constraints. WWW technologies require the understanding of hardware and software aspects, as well as their interaction, in order to successfully host a survey. As discussed before, the WWW was chosen as the medium of choice for this project because of its great potential. To establish a measure of control, a *.mil (military only) domain was assigned to the survey's web site so that only military systems could respond. This allowed for anyone at a military base with the correct login and password information to enter our site and complete the survey. The login and password features, along with the introduction page, were created outside the EZSurvey software. The transition, between these front-end screens and the EZSurvey, was transparent to participants.

4.2 DATA RETRIEVAL

The data was collected and stored in a text file located on the Sun workstation. As participants completed the survey, the text file was appended with their responses. Information such as the date, time, and machine IP were also collected for each participant. This additional information allowed the text file to be segmented. After all the responses had been collected, this text file was downloaded and read into EZSurvey.

5. DATA ANALYSIS

The analysis of the data was completed in several stages. First an approach to the data analysis was defined, then the data was run through the software's analysis application, and finally it was organized according to category for final interpretation. The initial approach to the analysis followed along the same lines as that taken for the question development. Since the data gathered was generated from the questions, it seemed logical to organize the responses into the same categories as the questions had been grouped. The questions were organized into the following twelve categories.

- Demographics
- Contractor
- Military
- Civilian
- Deployment
- Training
- Main
- Information Systems
- Fuels
- Supply
- Computers
- Hazardous Material (HAZMAT)

However, upon initial analysis of the data, it was found that the responses would be better described and analyzed if organized differently. The responses contained much more detail and spanned many more topics than anticipated. As a result, the approach for analysis was modified to incorporate a new organizational scheme. Four new categories and subcategories were defined and applied:

Computers	Personnel	Policy/Procedures	Equipment
Support	Training	Planning	FMSE
Modify Functionality	Reductions	Fuels policy/procedures	RF
Upgrades	Experience	Purple- Joint	Express Carriers
Connectivity	OPSTEMPO	Procedures	Satellite Communication
Equipment	Accountability	Funding	Supplies
TAV		Deployment Ensemble	Cryogenics
Bandwidth		Computers	Communications
DDL Interface			Reliability

These categories were arrived at by an analysis team review of answers to all of the objective and subjective questions.

As described in Section 2.2.1, a combination of objective and subjective questions were asked to capture all aspects of the supply/fuel functional area. The responses from these two question types were analyzed separately. A total of 118 questions were asked. Of these questions, 81 were objective, 9 were subjective, and the remaining 28 were a combination of both objective and subjective styles (hereon referred to as combination questions). These combination questions allowed the respondents to select from a list of predetermined responses or provide their own response. Both the objective and combination questions provided a unique opportunity to capture current concerns of the supply/fuel personnel.

5.1 ANALYSIS SOFTWARE

Once all the responses had been collected and downloaded from the server, the raw data files were run through the analysis software. Each respondent's data was collected and stored in an individual file. Since the objective and subjective questions were intermixed through the survey, so were their responses. Thus, the first task was to separate the objective, subjective, and combination responses.

The analysis software was resident in the main application, Raosoft's EZSurvey. The software's analysis function automatically calculated the objective question responses. Due to limitations of the software, responses to the subjective and combination questions had to be exported and analyzed manually.

Although the statistical capability of the analysis software offered weighting of multiple independent variables, descriptive means, standard deviation, and mode analysis, along with graphs and charts depiction, the survey's question response formats limited the applicability of these features. The objective questions consisted of multiple choice, check all that apply, rank order, and yes/no (binary) response types. These types did not lend themselves to extensive analysis. Rather, a descriptive mean and graph were reported for each question. The mean and percentage of hits per response choice were calculated for each question. These percentages were displayed in both tabular and graphic formats.

5.2 ANALYSIS OF RESPONSES

Although responses for the objective, subjective, and combination questions were organized into the same categories, their analyses were conducted differently. The objective question responses consisted of two to five predefined choices. As already discussed, the mean and percentage of hits per response were calculated and portrayed graphically. Since there were 81 objective questions, 81 bar charts were generated (Appendix A, Figures 1.1 – 13.1). In order to fully understand the measure from which these percentages were calculated, the total number of respondents given the opportunity to respond to that question was also reported in the lower right-hand corner of each chart. These means and percentages provided substantiation for observations and conclusions developed from the analysis.

The nine subjective questions in the survey could also be thought of as unstructured questions. These "open-ended" questions allowed for the richness and variety of the respondents' answers to be captured. These types of questions did not confine the respondent to a pre-defined list of answers. Rather, they collected the respondents' opinions and insights in their own words. As mentioned earlier, the original intention was to organize the responses in the same categories as the questions; however, this approach was changed as the result of the initial analysis. The research team independently read through the answers to each open-ended question and grouped the answers into the four new categories. The team members made judgements about the meaning or intent of the respondents when grouping the responses into categories. Then the team met to distill their categories into one set and to organize the answers into those categories.

Lastly, the combination question's responses were analyzed by a combination of the objective and subjective approaches. Through combining both of these approaches, a lot more light was shed on the current problems and issues in supply/fuel logistics.

6. RESULTS AND ASSESSMENT

All of the objective, subjective, and combination questions were consolidated and analyzed by the team's functional experts. It quickly became evident that there were four common focus areas or themes that carried throughout the survey results, regardless of the section of the survey. It also became evident that merely presenting the survey results might not give a clear picture and could be misleading. Thus, the team made the decision to not only present the survey results, but to provide an assessment of the key results to ensure they were viewed in context. That discussion is organized under the four focus area/themes: Information System Capabilities; Policies, Procedures, and Training; Deployment Support; and Asset Visibility. A fifth focus area/theme, Other Significant Results, discusses a key result of the survey that cuts across all of the other four categories. A significant part of the survey results assessment was the identification of areas in which the Laboratory (i.e., AFRL) could have a positive impact by performing some focused logistics research. Ideas for potential research projects are discussed at the end of this section.

6.1 INFORMATION SYSTEM CAPABILITIES

Survey results clearly showed that information systems are vital for supply organizations to operate. Respondents (87 percent) largely stated that they needed computers, the Internet, or networks to do their jobs (Appendix A, Figure 12.7). While 65 percent said they could not perform all their duties without internet connectivity (Appendix A, Figure 12.3), 64 percent responded that completing their duties without access to the Internet would be either "difficult" or "very difficult" (Appendix A, Figure 12.4). Respondents rated network access as even more vital; without it, 82 percent could not perform all their duties and 91 percent said it would be "difficult" or "very difficult" to do their job. (Appendix A, Fig. 12.3 – 12.6)

Lack of communication between systems and interfaces that do not operate properly, were mentioned as problems. For example, it was noted that incompatibilities between the Standard Base Supply System (SBSS) and Defense Fuel Agency systems required the same information to be entered into at least two different systems. In addition, 37 percent of respondents reported communication problems between SBSS, Air Force Equipment Management System (AFEMS), and Base Contracting Administration System (BCAS) (Appendix A,

Figure 11.3). Likewise, reconciling inventories between the Depot Maintenance Hazardous Material Management System (DMHMMS) and SBSS is a significant problem. Over 50 percent of respondents said this was a problem, and 17 percent responded that the problem was "serious" or "very serious" (Appendix A, Figure 13.1).

One survey question asked how often supply personnel had to develop custom programs to meet customer needs. Approximately 58 percent of respondents said they did so half the time or more and approximately 44 percent said they do it "often" or "very often" (Appendix A, Figure 12.1). This may indicate major inadequacies in standard programs. On the other hand, it could merely mean that supply personnel are using standard capabilities, such as Automated Stock Number User Directory (ASNUD) queries to get information for their customers. Additional study would be required to determine whether or not there is a problem here.

When asked if they used work-arounds to complete their daily tasks, 45 percent said they did (Appendix A, Figure 8.1). Of those using work-arounds, 47 percent did so because systems were outdated, sluggish or difficult to use. However, 49 percent said they rarely used work-arounds and 70 percent said work-arounds saved them less than an hour a day. (Appendix A, Fig. 8.1- 8.4). Of those respondents who reported using work-arounds, 44 of the 209 (21 percent) indicated the reason was related to system/software problems. For many of these problems, Discrepancy Reports (DIREPs) had already been generated; however, indications were that feedback on the status of those DIREPs and action to resolve them, was frequently perceived to be inadequate.

The Supply Automated Tracking System (SATS), the Automatic Tank Gauging (ATG) system, and other relatively new systems generally received positive comments from those respondents familiar with the systems (these are new systems and not everyone has used them). For example, 93 percent reported ATG as being an improvement over previous methods (Appendix A, Figure 10.5). SATS, Fuels Automated System (FAS), Dynametrics Microcomputer Analysis System (DMAS) and ATG were ranked best for frequency of complaints (Appendix A, Figure 12.10). Since the survey only focused on frequency of complaints, additional research would be required to determine what the specific complaints were.

Along the same line, 93 percent rated the ATG system an improvement over previous methods and 60 percent said the FAS interface was "easy" or "very easy" to use when accessing information. (Appendix A, Fig. 10.5 - 10.6)

In addition, a question was asked in the survey about a prototype system that was tried several years ago (that prototype was similar to the Automatic Data Collection (ADC) system which is about to be fielded). The prototype used a "key" that plugged into an aircraft and extracted data including the aircraft's fuel usage. The "key" was then plugged into a computer to update fuel documentation, including current fuel requirements. When asked to rate the prototype, 72 percent said it was "better" or "much better" than the current system (Appendix A, Fig. 10.4).

Comments throughout the survey clearly indicated a desire for supply to go to a paperless operation as soon as possible. Among other things, a paperless operation will eliminate control and auditing of paper documents. It could also reduce dependence on mini printers that are slow and sensitive to harsh environments (i.e., sand and heat) and the need to deploy paper and toner cartridges.

6.2 POLICIES, PROCEDURES, AND TRAINING

Comments collected throughout the survey that pertained to policy, procedures, and training were grouped together. Those comments spanned several topics, one of which was the consolidation of supply and transportation. When asked if they foresaw any problems with consolidating some supply and transportation processes, 62 percent of the 862 people who responded replied that they did not foresee any problems while 20 percent felt there would be problems. The remaining 18 percent did not know or selected " Not Applicable". (Appendix A, Figure 11.1) Although there were concerns about too few people and potential for degraded service, those who foresaw problems felt they would mostly revolve around training and career progression. For example, there were a lot of concerns voiced over a significant training burden resulting from consolidation of two such large and diverse career fields. It was mentioned that the training required for supply was already extensive and adding transportation to it would make it very difficult for people to develop in-depth expertise in a reasonable timeframe. Thus, there would be a risk of this new career field consisting of a group of generalists rather than functional experts. The same point was made repeatedly regarding career progression. The concern was that the massive amount of knowledge required in the new career field would make completing Career Development Courses (CDCs) and achieving competitive Weighted Airman Promotion System (WAPS) test scores very difficult.

Another strong theme focused on the turn-in process. Suggestions were made to take the turn-in process out of supply. When asked whether the part turn-in procedure could be improved, 200 of

the 780 respondents stated that there could be improvement (Appendix A, Figure 11.9). This improvement would allow for units to control their own turn-ins and work directly with the Defense Reutilization and Marketing Office (DRMO). It was mentioned that reparables should be shipped to repair sources directly from the flight line, possibly expedited through commercial carrier (e.g., FEDEX, Airborne, UPS) pickup points located at the squadrons. By eliminating processing delays in supply and transportation, the respondents felt items could get into the repair cycle in a more timely fashion. The implementation of a SATS-type scanner to track and document all actions would further aid in the transition of this process from supply.

Similarly, there was a call for mechanics to be given more capability to place orders right from the source. This would speed up the delivery process and consequently, the repair process. In order to accomplish this flight line ordering, there was a suggestion to utilize capable hand held computers.

Training generally received good reports. Over 75 percent said their job related training was either "effective" or "very effective" with only about 9 percent indicating it was "ineffective" or "very ineffective" (Appendix A, Figure 7.3).

Formal training for their job was attended by 68 percent of the respondents. Also, 83 percent reported that training was followed up with additional job-related training, of which 50 percent was OJT. Another 33 percent attended classes either on or off-site. Although 17 percent stated they received training by other means, many of their comments referred to going to technical schools (which is formal training) or studying CDCs (which are part of the OJT program). Based on those comments, it appeared that the percentages for formal training and OJT might, in fact, be higher than reported. Of particular note, only 8 percent thought their training was less than effective. (Appendix A, Fig. 7.1 – 7.3) Regarding training in manual supply methods (post-post), 73 percent stated they had that training and 84 percent reported remembering how to perform their job manually (Appendix A, Fig. 7.5 & 7.7).

On the subject of supply regionalization in Air Combat Command (ACC), respondents were largely undecided on whether or not any improvements had been realized. When asked if it had improved mission capable (MICAP) operations, 72 percent selected "Don't know/Not applicable", as 74 percent did when asked if it had improved stock control. (Appendix A, Fig. 11.10 - 11.11)

6.3 DEPLOYMENT SUPPORT

The survey clearly indicated that better computer equipment, faster setup, and more reliable connectivity were needed at deployed locations. Although 72 percent indicated they could do their job at deployed locations before computers and the Internet were setup, that number increased to 97 percent after computers and the Internet were in place (Appendix A, Figures 5.3-5.4). Along this same line, when asked what improvements could be made in deployed equipment, 58 percent reported that better computers were a priority (30 percent wanted faster computers while 28 percent wanted more portable computers). Another 21 percent reported that quicker equipment setup was required (Appendix A, Figure 5.5).

When asked about potential problems for the Air Expeditionary Force, respondents (26 percent) reported that there are too few people to adequately support the concept. While 54 percent said they deploy somewhere at least every two years, and 44 percent reported that they typically go for at least 90 days a year (Appendix A, Figure 6.1 - 6.2), 69 percent of those surveyed reported that they had not deployed in the last 12 months (Appendix A, Figure 5.1).

Some might find the 69 percent figure surprising given the high operational tempo, especially during the period of the survey. However, much of that activity was centered on deployment of individual flying squadrons, each requiring only a few supply personnel. In addition, many of those deployments were to established bases such as Aviano AB, Italy, or Incirlik AB, Turkey, where there was a supply squadron already in place; thus, deployment of large numbers of supply personnel was frequently not necessary.

Equipment used on deployments was reported as either "worse" or "much worse" than at home station by 51 percent of those responding (Appendix A, Fig. 5.6). That might have been acceptable in the past; however, AEF units now (or very soon) will deploy under the ACS concept with only a 7 day supply of parts vs. a previous 30 day supply. Thus, ACS requires resupply to start on arrival at the deployed location. Under those conditions, there will be increasing pressure on supply units to get the resupply pipeline going much more quickly than in the past. To be able to meet those demands. deployed supply personnel will need computer equipment and support at least as good as at home station. When asked if they deployed with any of the information systems they used in their present job, 71 percent said "no" (Appendix A, Fig. 9.2). In addition, the survey showed 21

percent felt that the lack of automated tools when deployed was a potential problem for the AEF (Appendix A, Fig. 5.7).

Lack of reliable connectivity was reported to be a consistent problem for supply personnel in their efforts to keep parts flowing, especially early in deployments, primarily because the connectivity frequently depends on landlines that are unreliable. Interconnectivity between information systems at deployed locations was ranked as the biggest concern with information systems, followed by connectivity from the deployed site to other locations, and having to input the same information into multiple systems (Appendix A, Figure 5.8). Given that the ACS concept calls for resupply to begin upon arrival at the deployed location, high priority must be placed on putting reliable connectivity (possibly linked to satellite communications) in place prior to arrival of deploying forces.

Survey comments further showed that supply personnel need deployment kits similar to those in aircraft maintenance. The kits should contain the equipment (computers and gear to network them as necessary) to link to home station, a main operating base, and/or directly to the depot systems. When this linkage does not exist, post-post (performing supply transactions outside SBSS, such as when the computer is down or otherwise not available) procedures become a problem. There is no way to "dump" information from a disk or laptop program when a deployment returns to home base or when access to SBSS is established/re-established. It was suggested that supply people need to deploy with computers, preferably high-speed laptops, pre-loaded with the necessary systems (SBSS, SATS, etc.) to do their job.

Most of the respondents (74 percent) reported that they did not receive refresher training before deploying; however, 95 percent of those who did receive such training reported that it was sufficient. Since most of those deploying apparently did well without refresher training, one might question the need for such training. However, comments indicated that there still is a need for training on the specific duties that people will be asked to perform while deployed because those duties might be different than what is routinely done at home. In addition, during a deployment there might not be someone readily available to answer questions. On that note, it was mentioned that specific instructions are needed which are easily accessible for reference while on the job. Likewise, it was noted that deployed locations need to build detailed continuity folders so that the site-specific knowledge is not lost when deployed personnel rotate.

The MRSPs got good reviews with 82 percent reporting that they had no recommendations for improving them. Likewise, only 14 percent had recommendations for improving the parts kit building process. (Appendix A, Fig. 8.5 – 8.6)

On the other hand, FMSE received considerable criticism with 53 percent (79 of 150) stating they had problems with the equipment. (Appendix A, Fig. 10.1 – 10.2) The deficiencies generally related to the equipment being poorly maintained; however, respondent's comments clearly indicated that inadequate parts and repair kits exacerbated the situation. It was also mentioned that some of the equipment was old and some was simply missing parts.

The survey indicated that local contractors play a relatively significant role at deployed locations. For example, 26 percent reported that contractors supply aviation fuel and 22 percent said their oxygen came from local contractors. Quality problems appeared to be rather prevalent, with 40 percent of the respondents reporting one to three quality problems per deployment. While only 12 percent reported quality problems with oxygen, 54 percent said they had quality problems with JP-8 (aircraft fuel) from local contractors at deployed locations. It should be noted that the survey did not gather data on exactly what the quality problems were or their degree of seriousness. (Appendix A, Fig. 10.7 – 10.9)

6.4 ASSET VISIBILITY

In this survey, 46 percent of the respondents reported total asset visibility (TAV) as being very important, but comments indicated significant deficiencies in the current TAV capabilities (Appendix A, Figure 11.7). A big concern was the fact that supply and transportation computer systems do not communicate. It was noted that, at a minimum, a Cargo Movement Operations System (CMOS) - SBSS interface is required.

Although 97 percent stated that they could perform their duties after computers were setup at the deployed location, there was a clear indication that better computer equipment and faster setup were needed (see 5.3 above).

Lean Logistics, Agile Combat Support (ACS), and other current high visibility Air Force programs all emphasize less wing level part and component maintenance support and the deployment of fighting forces with increasingly lighter logistics packages. Given those realities, it is vital that

wing level logisticians know what assets are available, what their status is, and exactly where they are at any given time (i.e., TAV). Much of this responsibility is relegated to supply organizations; however, the survey clearly pointed out significant shortfalls in their ability to provide TAV.

While 60 percent said they understood the importance of time-definite delivery, there appears to be a conflict in the survey responses regarding in-transit visibility (ITV). Although 62 percent said they do not need ITV, 46 percent reported that it is very important to them and 90 percent reported they needed it either in shipping, enroute, receiving, or at destination. (Appendix A, Fig. 11.5 – 11.7) Without additional information, one can only speculate on the reason for the disparity.

6.5 OTHER SIGNIFICANT RESULTS

Because not all of the comments collected fit cleanly under the categories already covered, this section was created. The discussion here is focused on the need for a complete reengineering of supply.

Comments throughout the survey pointed to the concern that there were no longer sufficient numbers of personnel to provide the level of mission support ACS calls for and on which the success of the AEF concept depends. For example, 50 percent of those responding said that there were too few people to meet deployment objectives, and continuing to support rotational sites over and above AEF tasking were potential problems for the AEF (Appendix A, Fig. 5.7). In addition, there were several references to work not being completed as well as it had in the past, due to a lack of trained and experienced people, and to longer hours impacting family life, morale and retention. Although there were several unfavorable comments made about more frequent and longer deployments, responses to deployment questions in the survey raise some doubt as to whether that was actually a problem (see Section 5.4). Without additional research, drawing more specific conclusions from this information would be highly speculative.

Throughout the survey, there were references to supply organizations performing essentially the same job as always, but with significantly fewer people. The inference was that they were doing what they always have, only less well. Likewise, it was mentioned that although there was a move to regionalization of supply, the customer support requirements at the bases had not changed. The only change was a decrease in the wherewithal to provide that support. In addition, while only 20 percent foresaw problems in the consolidation of supply and transportation functions (Appendix A, Fig. 11.1),

the reported concerns focused heavily on the lack of trained people, degraded customer support, and outmoded processes.

Along that same line, comments indicated a pressing need to eliminate redundant and non-value-added work. An example was the turn-in process (see Section 5.4) that required supply involvement simply because that was the way it had always been. The most widely discussed problem in this area, and the most emotionally charged one, was controlling and reconciling delinquent documents. While 28 percent reported spending 1 to 5 hours per week reconciling delinquents, another 18 percent reported spending between 5 and 10 hours a week (Appendix A, Fig. 11.8). The comments clearly highlighted this as a big man-hour consumer and a major source of frustration.

In short, the survey indicated a need for a bottom up reengineering of supply. That reengineering effort should leverage the talent of those actually performing the supply mission to build new processes (rather than rearranging the old ones) based on current policies and operational concepts (e.g., Air Expeditionary Force, Agile Combat Support, and Regional Supply Squadrons). These new processes would refocus supply activities on direct mission support. In addition, the reengineering effort would eliminate, or identify for outsourcing, functions without direct mission impact in the current operational environment. Such an effort would also highlight areas where technology could be implemented to improve mission support.

Although it may be an ambitious undertaking, the survey indicated that a reengineering effort of the magnitude described here would have a profound impact.

6.6 POTENTIAL RESEARCH AND STUDY AREAS

Upon review and assessment of the survey results, it became clear that there were several areas in which deeper study was required. In some cases, that study may only take the form of a headquarters staff action to fix a problem—or to determine that one does not exist. On the other hand, the survey identified some areas in which detailed study and/or logistics research was definitely required. In those instances, the expertise of organizations such as the Air Force Logistics Management Agency (AFLMA) and the AFRL itself, would be suited for the task. The remainder of this section is devoted to discussion of those areas requiring deeper study.

6.6.1 Total Asset Visibility (TAV)

TAV has taken on a whole new significance with the advent of ACS and the AEF. It has been a subject of discussion in the logistics community for nearly 10 years, and there has certainly been notable progress; however, most would agree, as indicated by the survey, that there are still some significant deficiencies yet to be overcome. Part of the problem was that TAV, although nice to have, frequently wasn't considered to be important by many in the logistics community. The reason was that stock levels of spare parts, supported by extensive intermediate (base level) repair capability and 30 day spares kits, kept USAF mission capable rates consistently high. However, in recent years, steadily declining budgets have resulted in major reductions in stock levels. Likewise, budget driven initiatives, such as Two Level Maintenance, have significantly reduced intermediate repair capability. In addition, the AEF and ACS concepts have mandated 7-day vs. 30-day spares kits.

Suddenly, TAV is no longer just a nice to have. It has now become extremely important for the logistics community to know exactly where every part is in the maintenance, distribution, and supply chain, what the status of those items is, and when they can be in the hands of the flight-line people who need them to support daily operations. In the case of deployed forces in a contingency situation, TAV can be the difference between success and failure.

Merely putting the information "out there someplace" isn't enough. Those who need it, must have the capability to get to information in a timely fashion. As the survey pointed out, reliable connectivity between systems on the base, both at home and deployed, coupled with reliable external communications (preferably satellite based) is a basic requirement.

Because TAV is so vital to the long-term success of the AEF, it is equally vital that the Air Force have a clear understanding of what it takes to provide seamless TAV, where the holes are in that capability today, and what, if anything, is being done to plug them. The survey showed that, although TAV is important, an integrated, seamless capability to provide it does not appear to be there today. There are certainly initiatives in work such as the Integrated Maintenance Data System (IMDS), Integrated Logistics System-Supply (ILS-S), and the Lab's own Integrated Technical Information for the Air Logistics Centers (ITI-ALC) program that should vastly improve the situation. However, the importance of this issue clearly calls for a logistics research effort to assess TAV capability from beginning to end. It should validate specific information requirements throughout the maintenance, distribution, and supply chain, verify an existing or planned capability to satisfy those needs, identify

specific shortcomings, and make detailed recommendations to rectify those shortcomings in both the near and long-term. This effort should begin immediately, be done by a dedicated research team independent of individual MAJCOM influences, and focus solely on support of the AEF. Such a research effort, although aggressive, will provide the Air Force with a solid assessment of its capability to provide TAV sufficient to support the AEF.

Besides a research effort to assess overall TAV requirements over the long term, there is a more immediate TAV requirement. Deploying units must be able to quickly get networks set up and establish linkage to home station and/or a main operating base. Without immediate connectivity available, AEF units will have major problems replenishing their 7-day spares kits in time to preclude significant mission impact.

Survey comments indicated that supply needs deployment kits similar to the toolboxes that maintenance personnel deploy with. Those deployment kits should include the tools and equipment supply needs to do their job. High speed lap top computers, preloaded with SBSS and critical software, plus cables and networking equipment are some of the things that respondents felt should be in those kits. MAJCOM staffs need to ensure that supply is provided with these deployment kits as soon as possible.

6.6.2 Fuels Mobility Support Equipment (FMSE)

The message from survey respondents regarding FMSE was unmistakable—it needs a hard look. This may well be the most clear-cut result of the entire survey. Seventy-nine of one hundred fifty people surveyed had problems with FMSE. Some of the reported problems, such as missing or broken parts and leaking fuel bladders, may well be indications of funding problems, inadequate maintenance, or both. However, there were also numerous references to old systems, aging units, outdated equipment, and the like, all of which indicate that it is time to consider something new.

With the AEF concept calling for bombs on targets within 24 hours of arrival at a deployed location no matter where that location is, a reliable capability to store and pump fuel is a pass or fail item. Additional fundingmight mitigate the problem in the short term, but a long-term fix calls for more than that.

It is time for a research effort to not only explore requirements for new FMSE, but also to assess fuels mobility support concepts with the goal of vastly improving capability in this vital area of AEF support. The research should include a review of fuels mobility support requirements in the light of current operational concepts (i.e., AEF and ACS) and consider potential contingency situations from limited responses to large-scale combat operations. Likewise, it should consider not only support of current U.S. weapon systems, but those coming in the future, such as the F-22, Joint Strike Fighter (JSF), and the CV-22. In addition, support of joint and coalition forces must not be ignored. Such issues as maintainability, reliability, usability, and mobility footprint will also have to be addressed in detail.

6.6.3 Cryogenic Equipment

Although there were no major problems related to it in the survey, an immediate and reliable supply of aviation breathing oxygen is vital. This is especially true with AEF requirements for bombs on targets in 72 hours from deployment. Given the short notice inherent in the AEF concept, and the likelihood of going to austere and potentially hostile locations, having to depend on local contractor support for immediate supplies of something as critical as oxygen might be a recipe for disaster.

The survey showed that contractors supply oxygen in deployed locations 22 percent of the time. In some locations, however, it will simply be dangerous to rely on contractors, if there are any available in the first place. In those areas where there are no contractors, a reliable source of oxygen takes on a whole new significance.

The requirement certainly doesn't go away simply if there are no contractors, so units will need some capability to generate their own oxygen. Although some future weapons systems may incorporate technologies such as On-Board Oxygen Generating System (OBOGS) that still doesn't address the problem for today's aircraft, many of which will be in the inventory for another 15 years or more. The cryogenic equipment the Air Force uses today to make oxygen is big, bulky, and hard to operate and maintain, and would be a challenge to deploy.

Therefore, research should begin now to explore the science and technologies that might be available or on the horizon, to provide AEF units with a highly reliable, mobile, and easy to operate capability to generate oxygen. With such systems as OBOGS already in existence, this should not be

a particularly risky program and should be able to provide results much quicker than is normally expected of such a research effort.

6.6.4 Supply Work-Arounds

To preclude potential impact on AEF operations, supply needs to be able to do their job as rapidly and efficiently as possible, both at home and while deployed. Throughout the survey, there were indications that might not be happening. For example, 45 percent of respondents stated that they needed work-arounds to do their job every day. Yet, 70 percent said those workarounds saved them very little time (less than an hour a day). It may be time for a review to determine if supply actually has the system support needed to meet mission requirements. That review should cut across MAJCOMs and should be focused on AEF support. Because of the heavy functional context of the effort and the fact that it should be done quickly, the AFLMA might be the right organization to take this on. The effort should center on validating the survey findings and assessing what short and long-term fixes might be required if those findings prove to be accurate.

6.6.5 Integration of Logistics Systems

Throughout the survey responses, references were made to logistics systems not talking to one another and/or to interfaces that did not work as needed. For example, respondents said that in some situations the same information was required to be entered into SBSS, then again into the Defense Fuel Agency systems. There was also mention of similar concerns regarding AFEMS, BCAS, and DMHMMS. In addition, some of the transportation systems do not communicate with SBSS or, in some cases, with each other. Although ILS-S and other modernization efforts are designed to eliminate these problems, there was enough concern voiced in the survey to warrant another look.

Research should be conducted to review the efforts, both planned and underway, to address the integration of logistics systems. This research should be based on the requirements of field units to support AEF tasking over the long-term. It should identify/validate what those system/information requirements are and confirm that there are programs, systems, and/or capabilities in place or on the way to meet them. Shortfalls should be identified in unambiguous terms to facilitate immediate action to rectify them. Another aspect of logistics system support that should be immediately reviewed is standard system/software problems. Of those who reported needing to use work-arounds, 21percent said it was due to such problems. The review should include a hard look at management of the DIREP

process. There were numerous comments in the survey that clearly showed that a large number of problems were the result of inadequate or slow response to DIREPs. This review of standard system/software problems should be a priority action item for AFMC headquarters.

6.6.6 Deployment Training and Continuity

Comments from the survey indicated that there is a need for continued pre-deployment training and for continuity folders on the specific duties a person will perform during a deployment. Although the supply people deployed are qualified, they sometimes are required to perform different duties than they do at home. In addition, procedures and/or the systems used during deployments are sometimes significantly different than at home. Furthermore, at home there normally will be someone around to ask if a person is not exactly sure what to do; however, that might not be the case during a deployment. Likewise, there might not be time to contact that person at home due to the mission intensity during deployments, especially in a combat situation.

A study to identify how to optimize the training that is already being conducted and to provide relevant continuity folders at deployment sites would be an excellent contribution to AEF effectiveness. This effort should be focused on achieving quick results employing available technology. The training should be built to address the duty requirements at the specific location to which a unit is preparing to deploy. It should be backed up with on-line continuity folders immediately available to supply personnel upon arrival at the deployment location. This ensures that as people rotate, mission effectiveness does not suffer. AFLMA is probably best suited to handle this study.

7. LESSONS LEARNED

Like many other projects that span a considerable amount of time (in this case over a year), this project encountered several redirections in methodology due to equipment and data collection difficulties. These failures, in some cases, shed a lot of light on lessons to be learned for the next project. The lessons learned are gathered throughout the entire course of the project. The very nature of these lessons are such that they could not have been avoided by preparations, rather they are learned as a result of performing the very elements of the work. In this project, the lessons learned can be organized according to software, survey response rate, and help desk. These three categories represent unique problems and constraints encountered throughout the project.

7.1 SOFTWARE

As discussed in great detail in Section 2.1, software selection criteria were closely examined and evaluated. To prevent surprises during development, several prototype surveys were created with demonstration software. Although these demonstration versions provided a good understanding of the various software packages, there was no way of foreseeing all potential problems.

The software selected for this project, EZSurvey, was the best of all available packages; however, it was not perfect. Several constraints were encountered with the analysis function of the software. The objective analysis procedure behaved differently than expected. For example, the objective questions were reported in terms of the total number of hits per provided choice. If a question had 5 multiple choice responses to select from, the software provided a table listing all 5 responses and next to them the number of hits each received. The software then provided a calculation of the percentage for each response choice. Because of the survey's extensive branching, not all of the questions were presented to all of the participants. Thus, the total number of people exposed to a question varied. This variability was not accounted for in the software so the calculated percentages were incorrect. By knowing the raw response rate per choice, the percentages were easily calculated in an Excel worksheet. Because the numbers provided by the analysis procedure were wrong, so were the graphs generated off that data. This resulted in all the graphs having to be generated in Excel also. Although this was not a very difficult task, it was an additional time consuming step that was not expected.

7.2 SURVEY RESPONSE RATE

The survey response rate was a major discussion topic from the beginning of the project. No matter how comprehensive the questions and clear the structure, a WWW survey would not be successful unless it was completed. Drawing from the performance of past surveys and researching literature on WWW surveys, the team felt that a __ percent response rate should be expected. Of the approximately 13,891 supply/fuels personnel asked to participate, it was believed that ___ would actually take the time to respond. To improve that percentage, one member of the team traveled to several bases to solicit participation. This effort facilitated the overwhelming participation experienced during the survey's 52 days of deployment. The survey was released on 10 March 1999, and ran until 30 April 1999. Much to everyone's surprise, the average response rate was a fraction over 22 per day throughout the length of the 52-day deployment. Responses were gathered from bases all over the world and at all hours of the day.

The popularity of the survey led to the need for the data to be divided. The deployment period was divided in half. The first half consisted of 679 responses in the first 27 days, followed by 484 responses the last 25 days. The grand total of 1163 responses surprised the entire team. Figure 5 depicts the daily response rate.

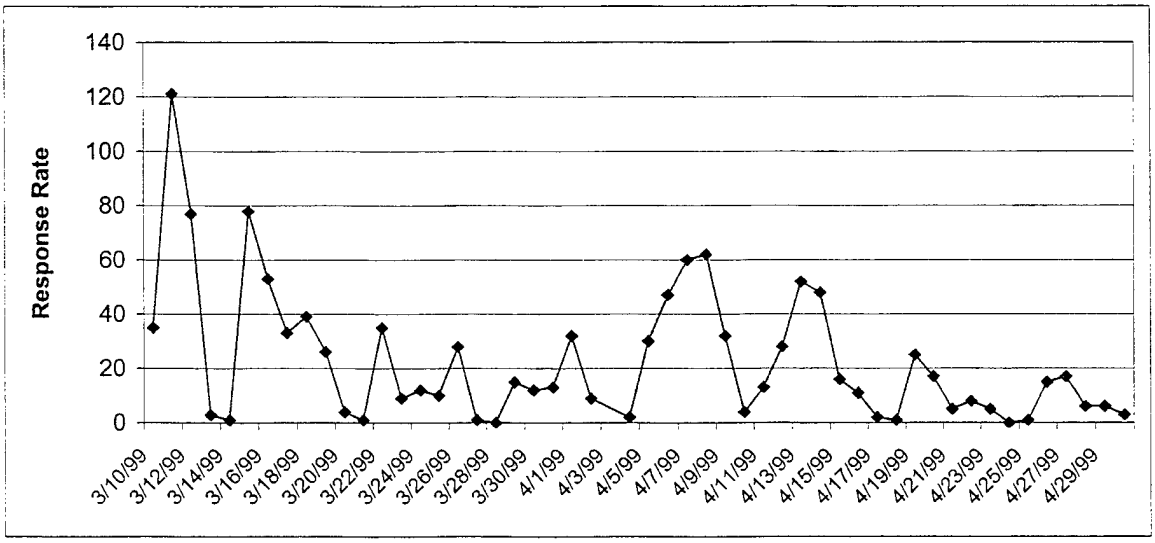


Figure 5 Daily Response Rate

Although these unexpected additional responses were welcomed from an information collection standpoint, the shear number of responses clogged our data organization and slowed the analysis process. Procedures were not established to handle this large number of responses.

As a result, the entire data set was divided into two as described above. Each data set was organized and analyzed separately and then later combined. This modification to the procedure was irrelevant to the final results of the survey. Although this lesson learned was not a showstopper, the volume of responses gathered from future WWW surveys may exceed expectations as it did in this case.

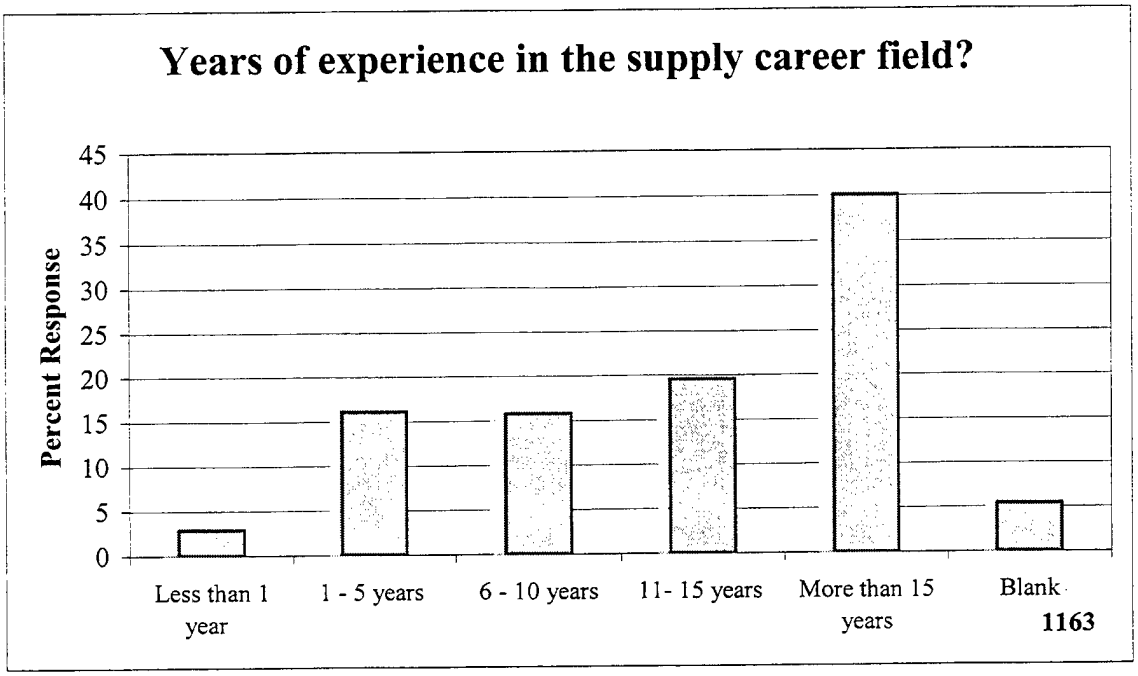
7.3 HELP DESK

Following along the same lines as the sections above, the large number of responses placed a considerable strain on our help desk resources. In help desk, we established an e-mail address and phone number to all participants so that they could ask questions. Quite a few people took advantage of these avenues and asked questions ranging from how to get connected to the survey's URL to what was the login name and password. In order to control the sample population, only computers with a .mil domain were able to view the survey. The participants were also provided with a login and password. This information was provided with the material sent out requesting the initial participation. However, as expected with a response of over a thousand people there were problems and questions. Typically they were answered within minutes or at the latest, one day. There were no problems that went unsolved. Again, if this large response rate had been anticipated, several other avenues would have been established to aid the participants, thus making the team's job a lot simpler.

APPENDIX A – OBJECTIVE RESPONSES

Demographics Section
1163 Participants Given Opportunity To Respond

Demographics Section



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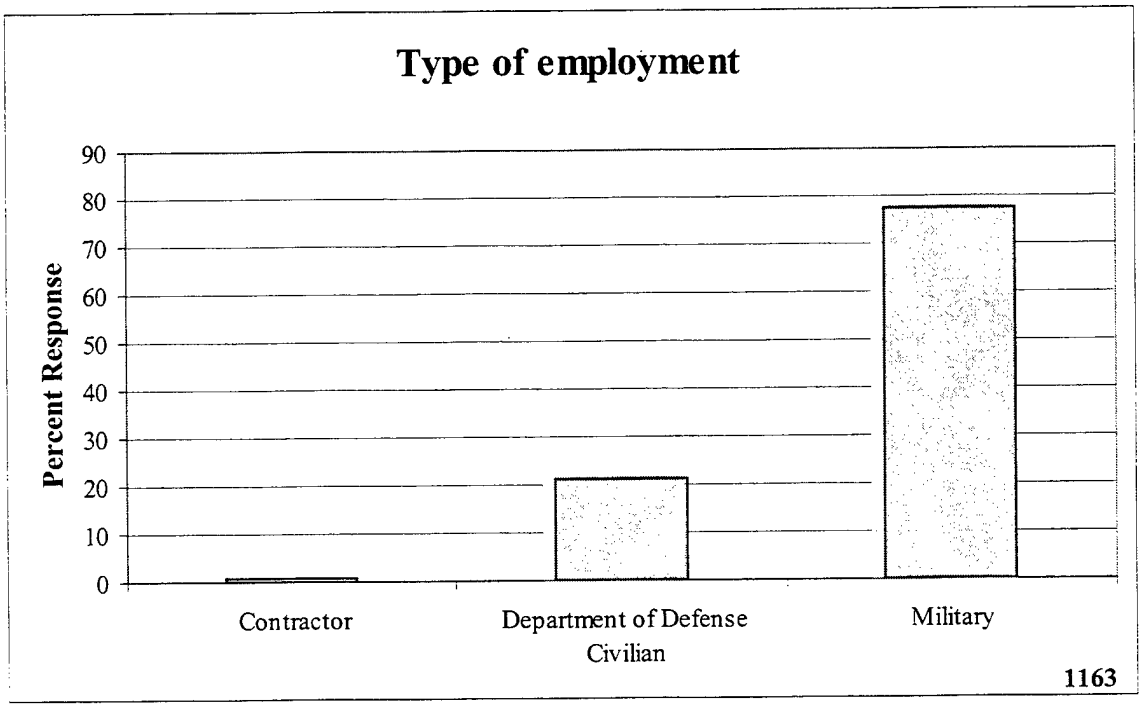


Figure A 1. 2

Contractor Section

12 Participants Given Opportunity To Respond

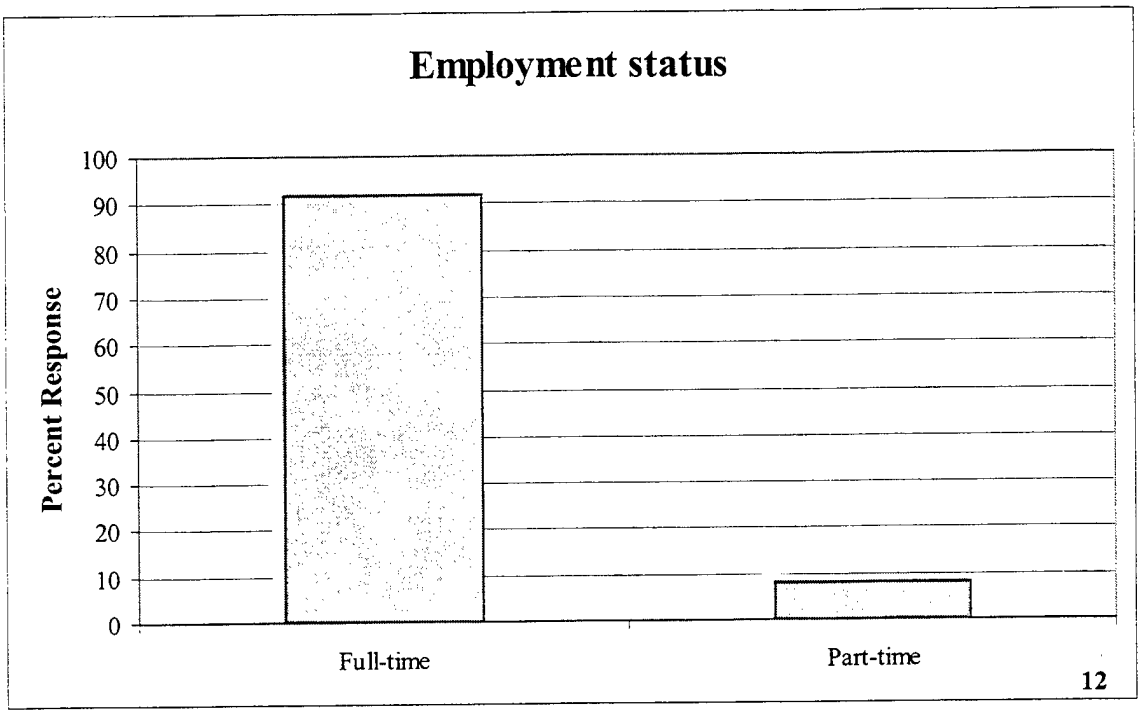
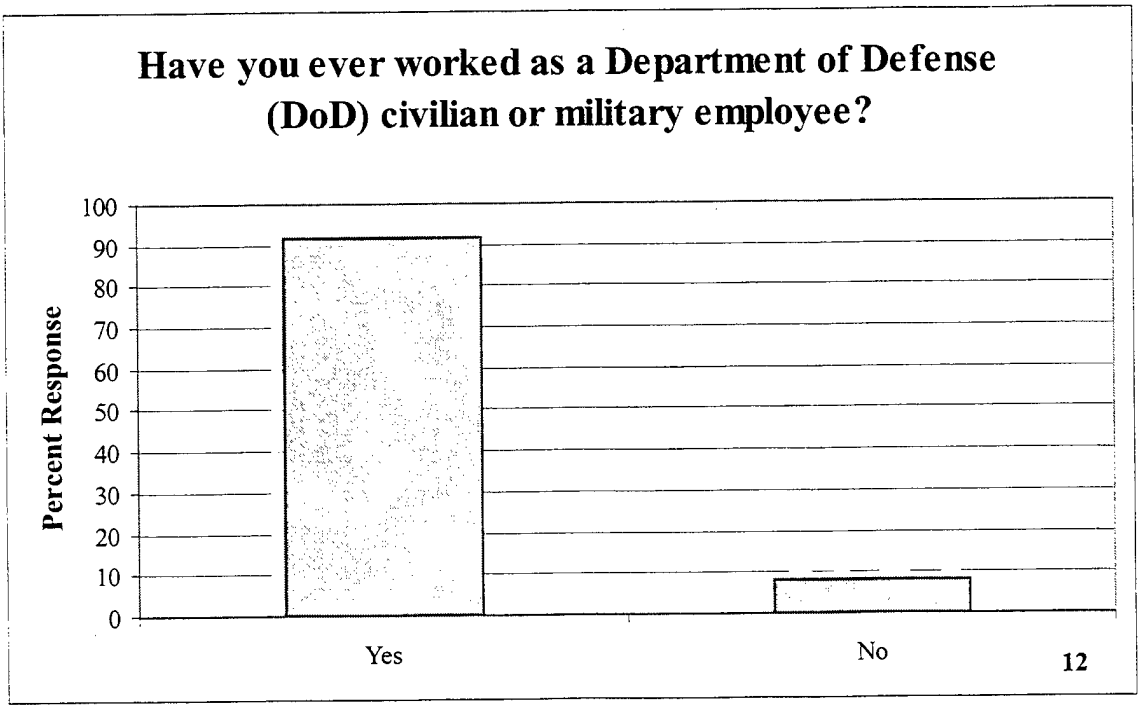


Figure A 2. 1



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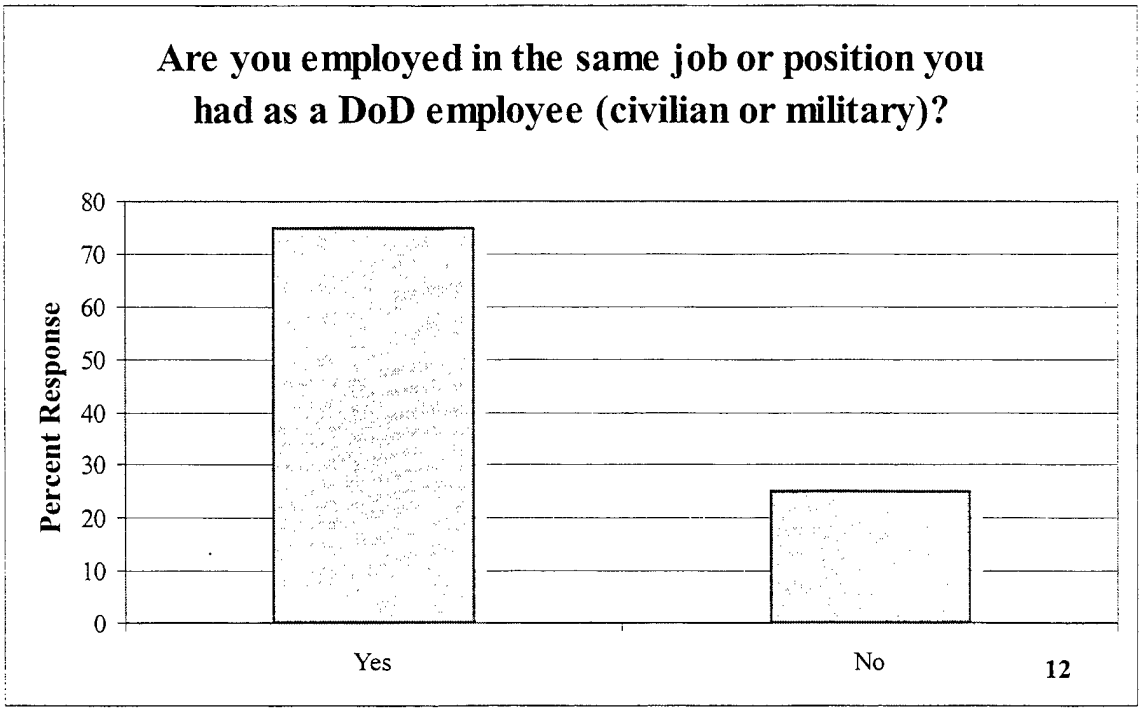

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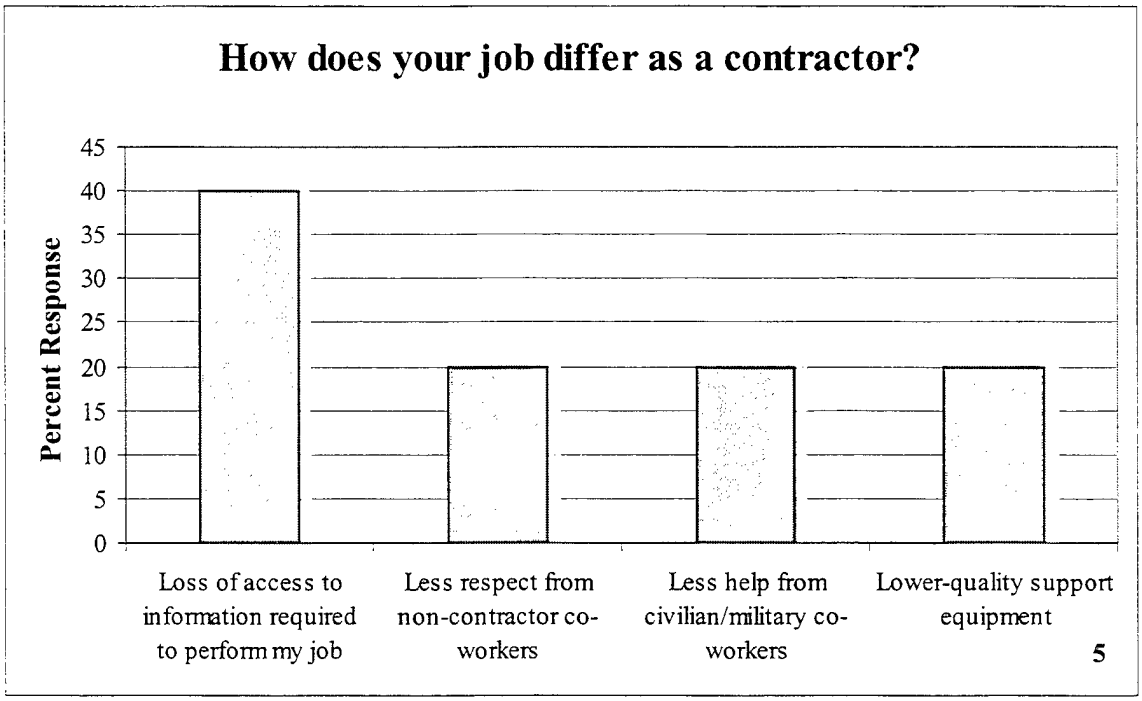

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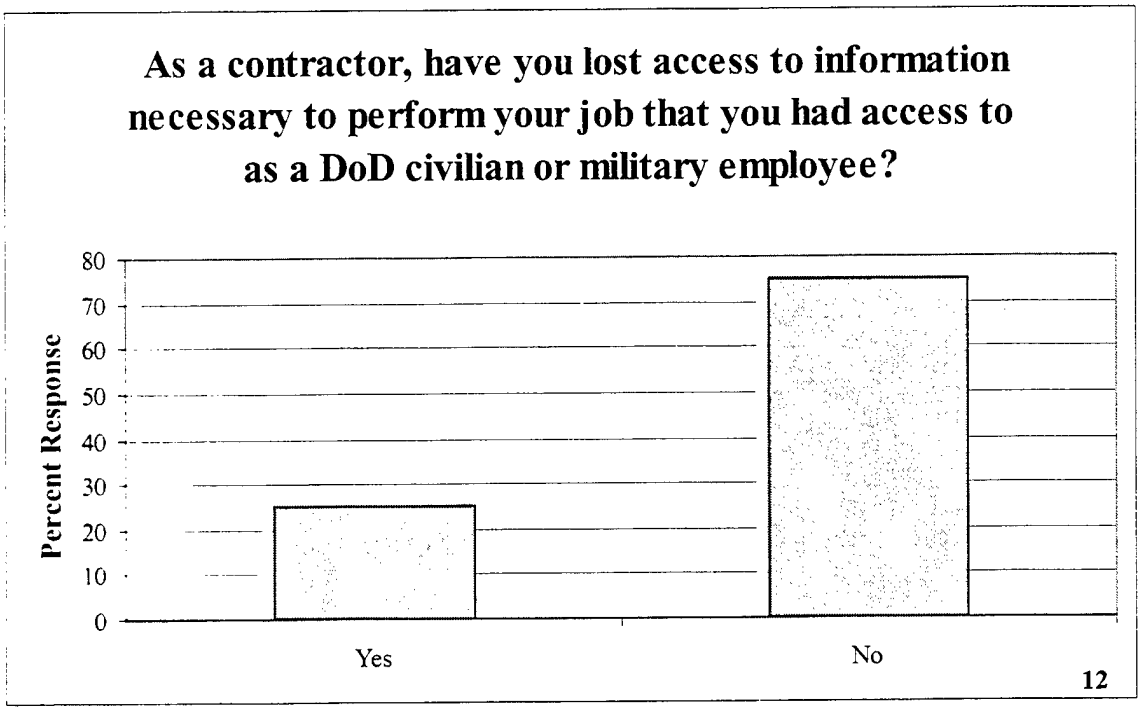

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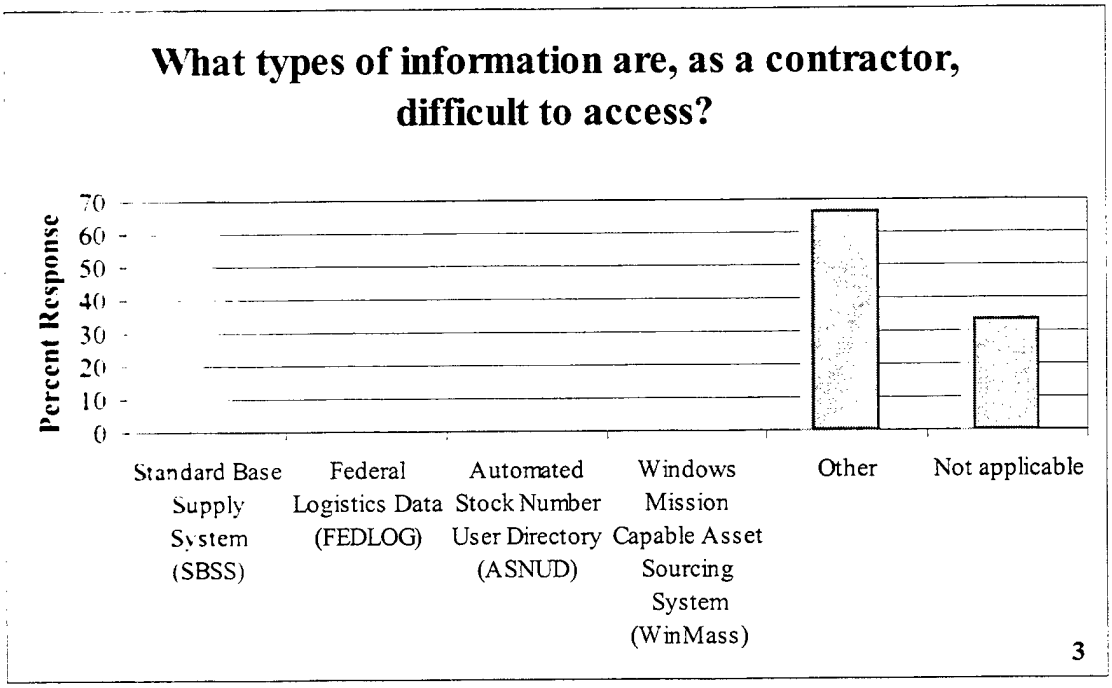

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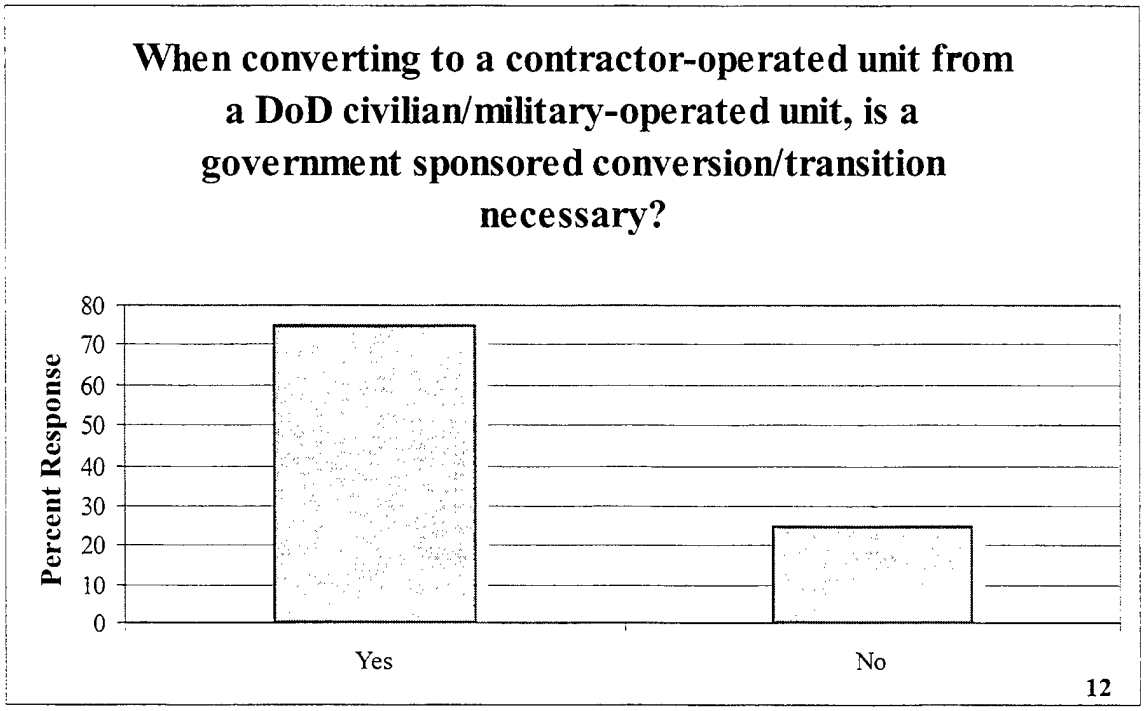

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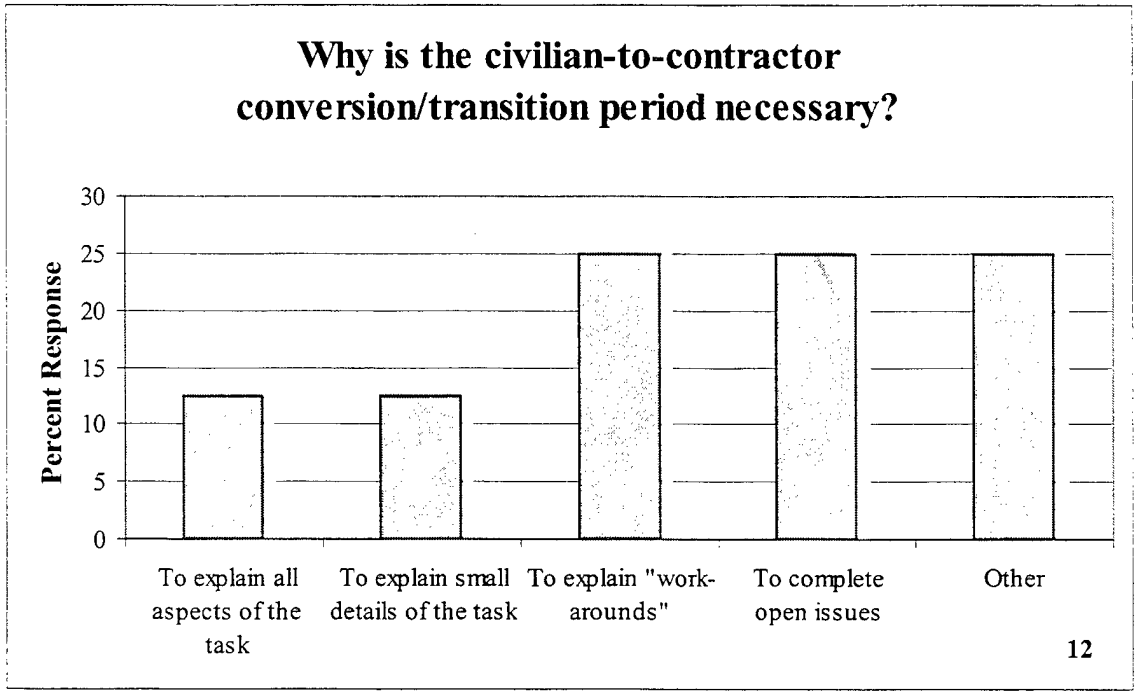

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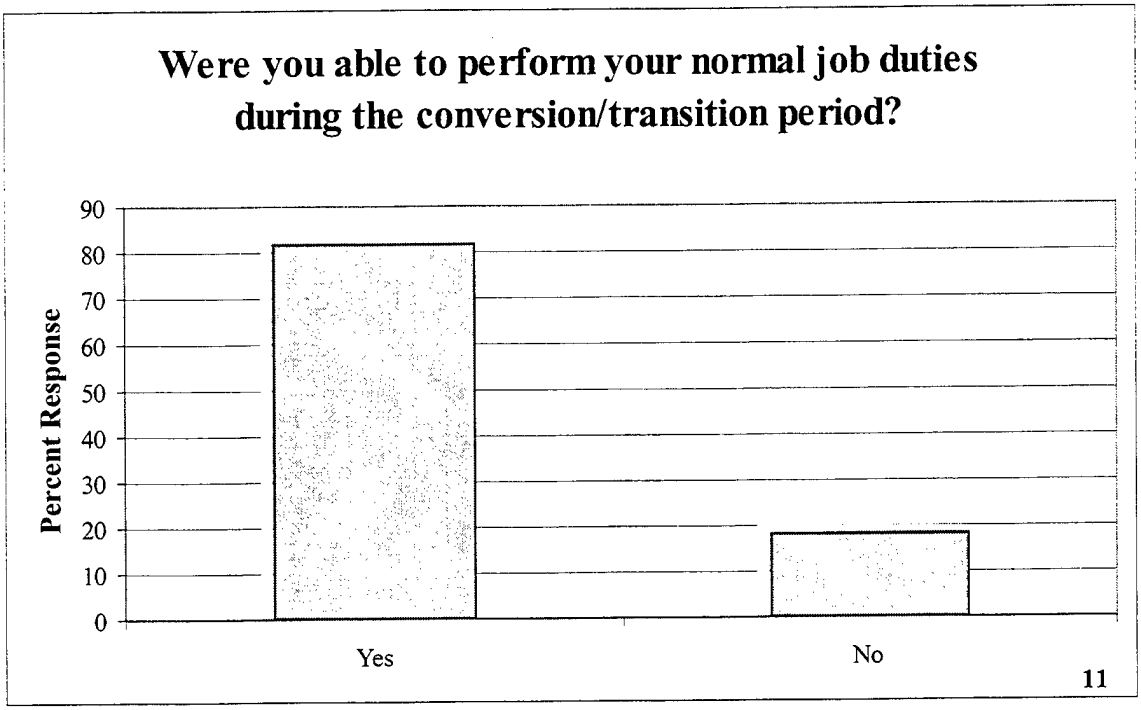

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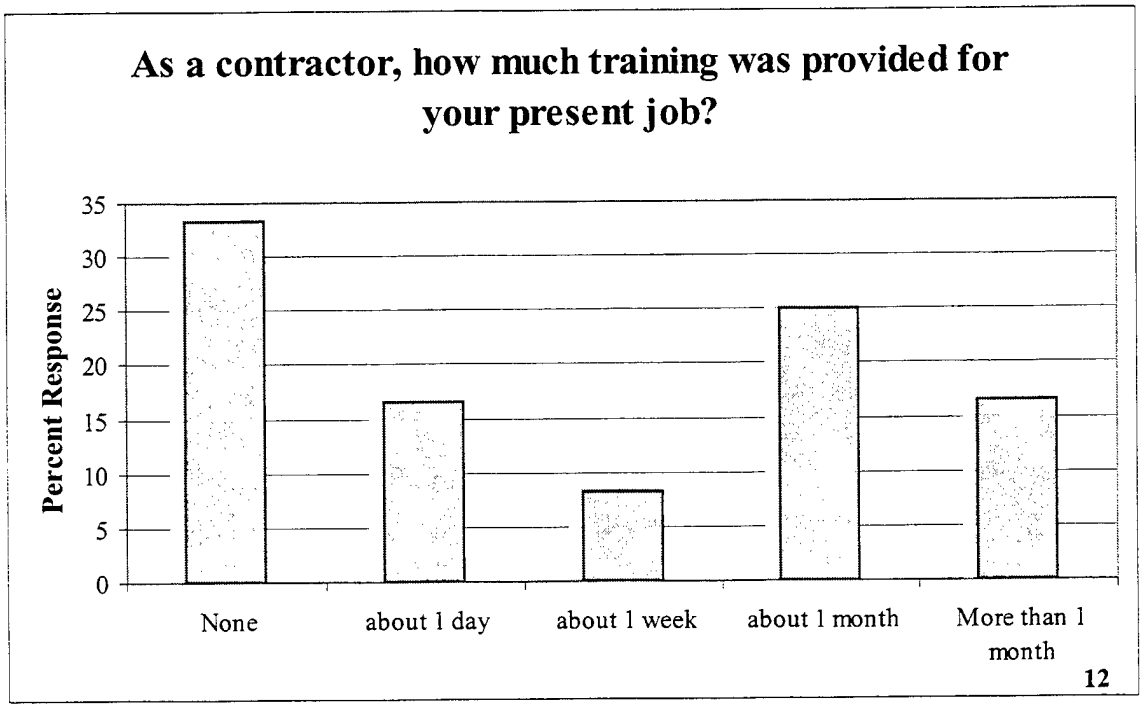

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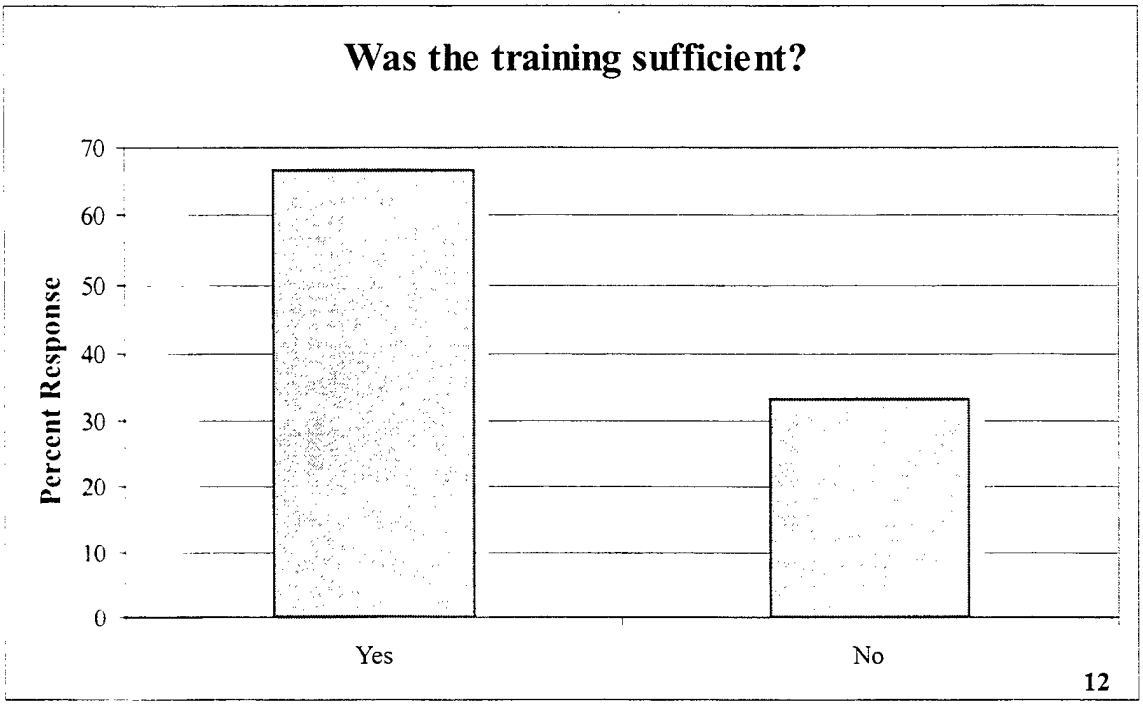

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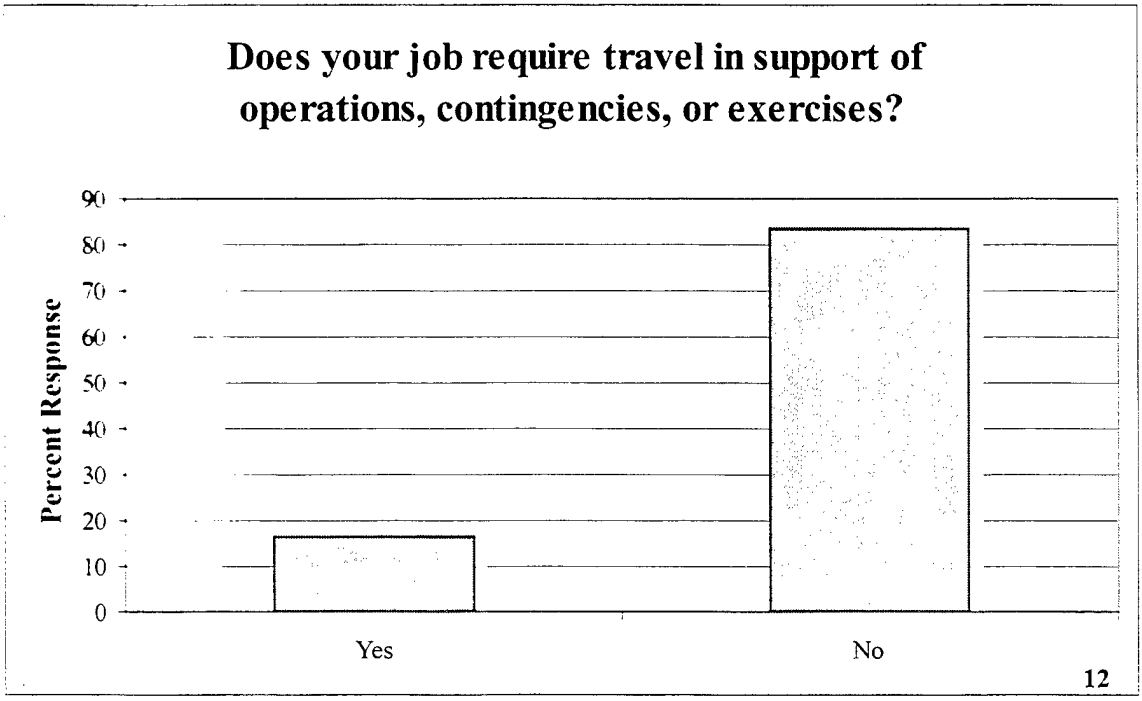
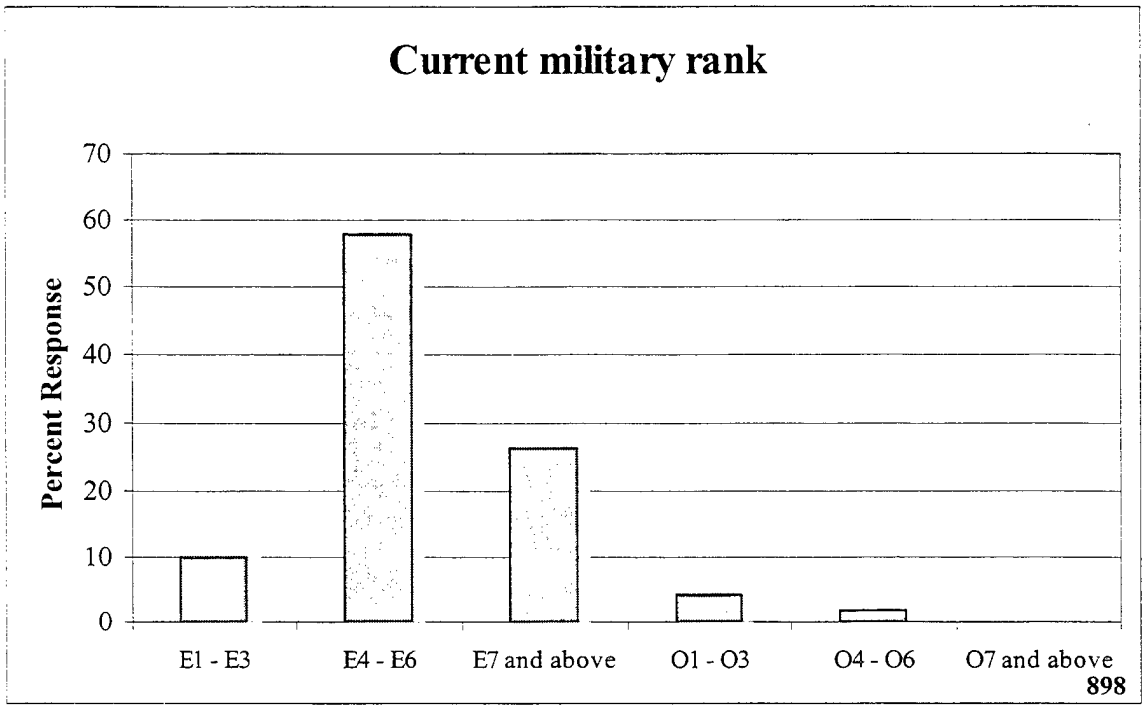


Figure A 2. 12

MILITARY SECTION

902 participants given opportunity to respond



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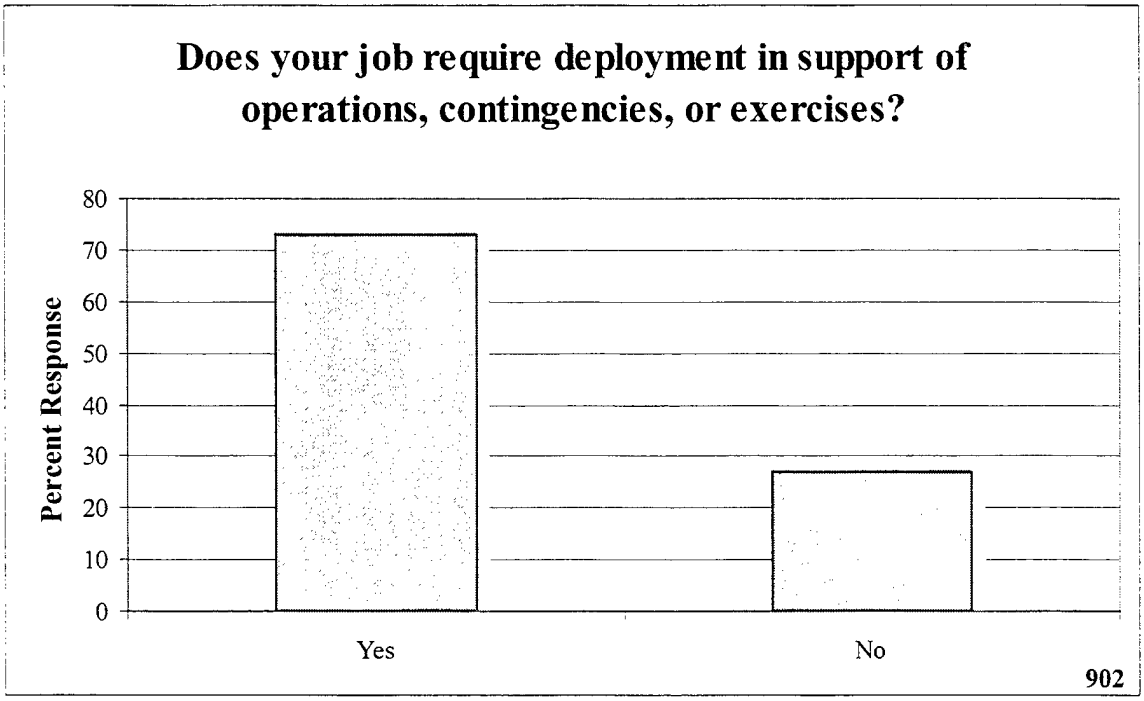
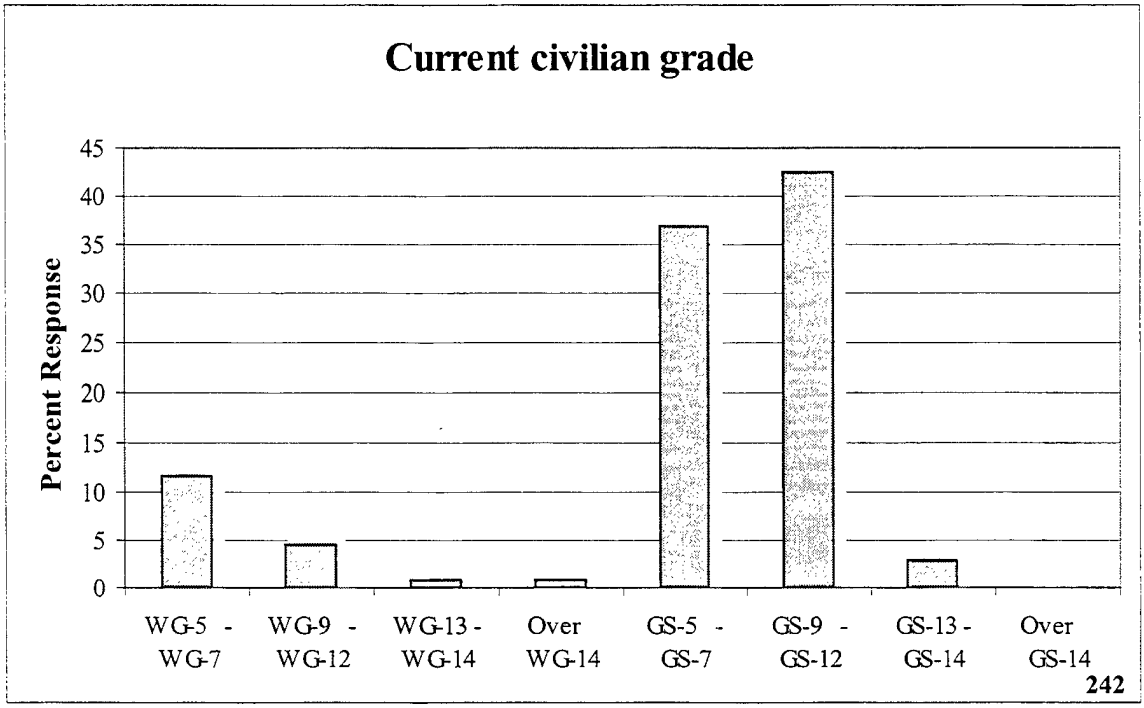


Figure A 3. 2

Department Of Defense Civilian

249 Participants Given Opportunity To Respond



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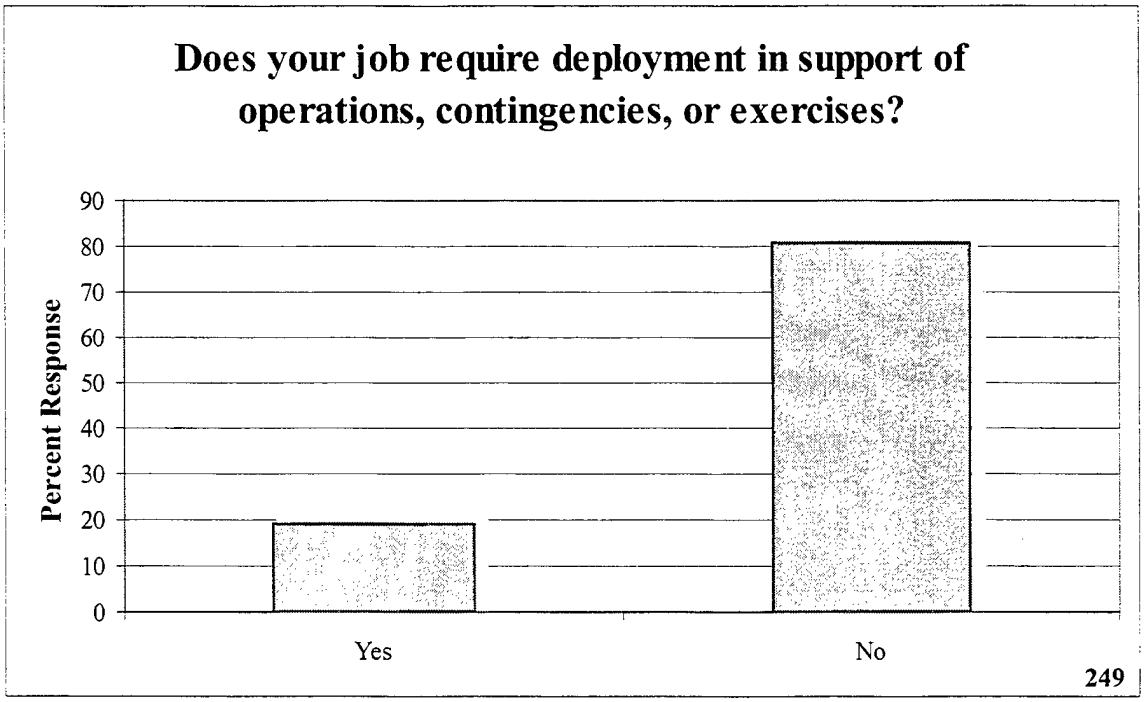
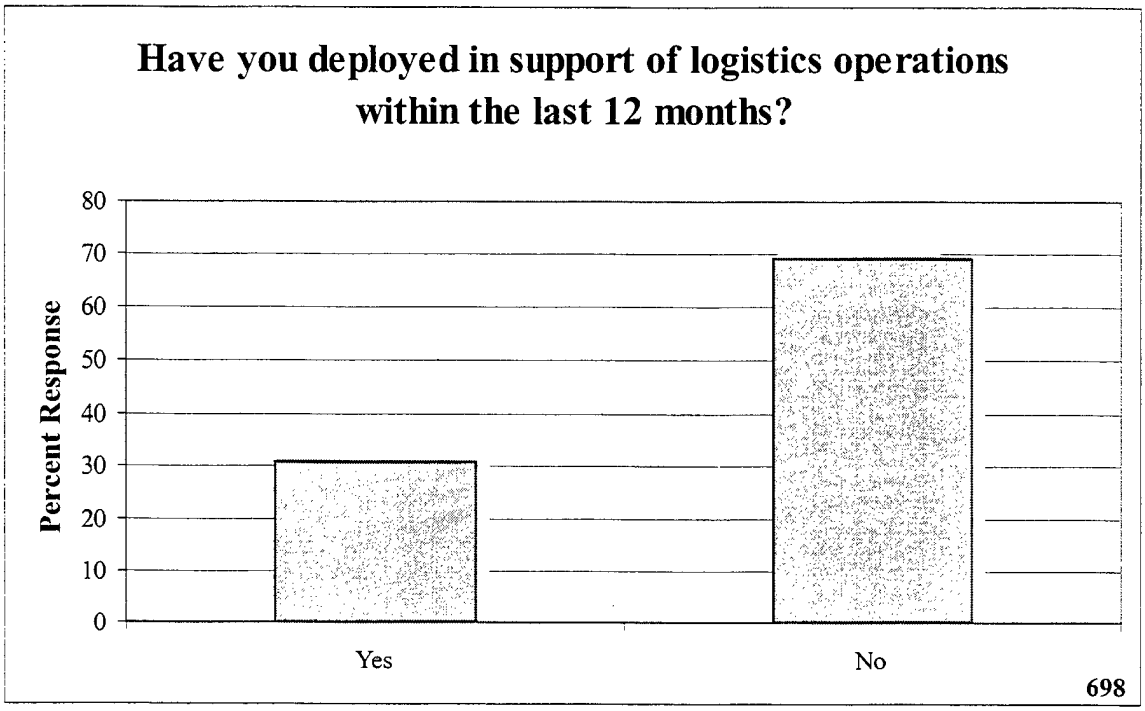


Figure A 4. 2

Deployment Section

708 Participants Given Opportunity To Respond



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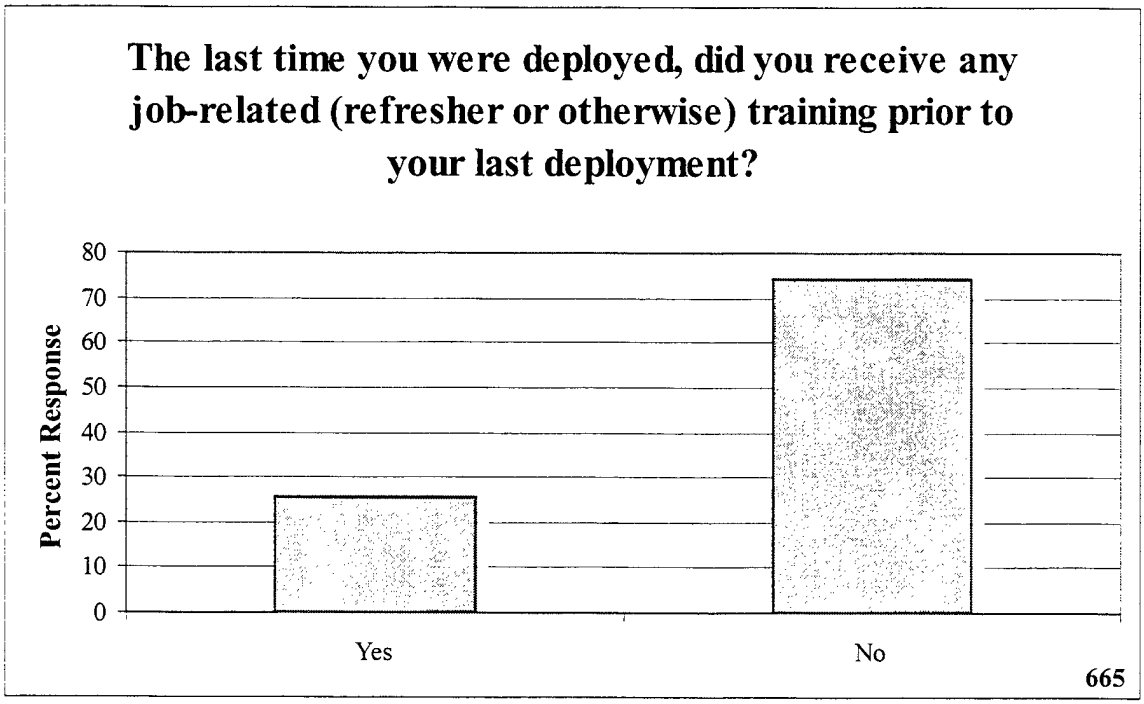

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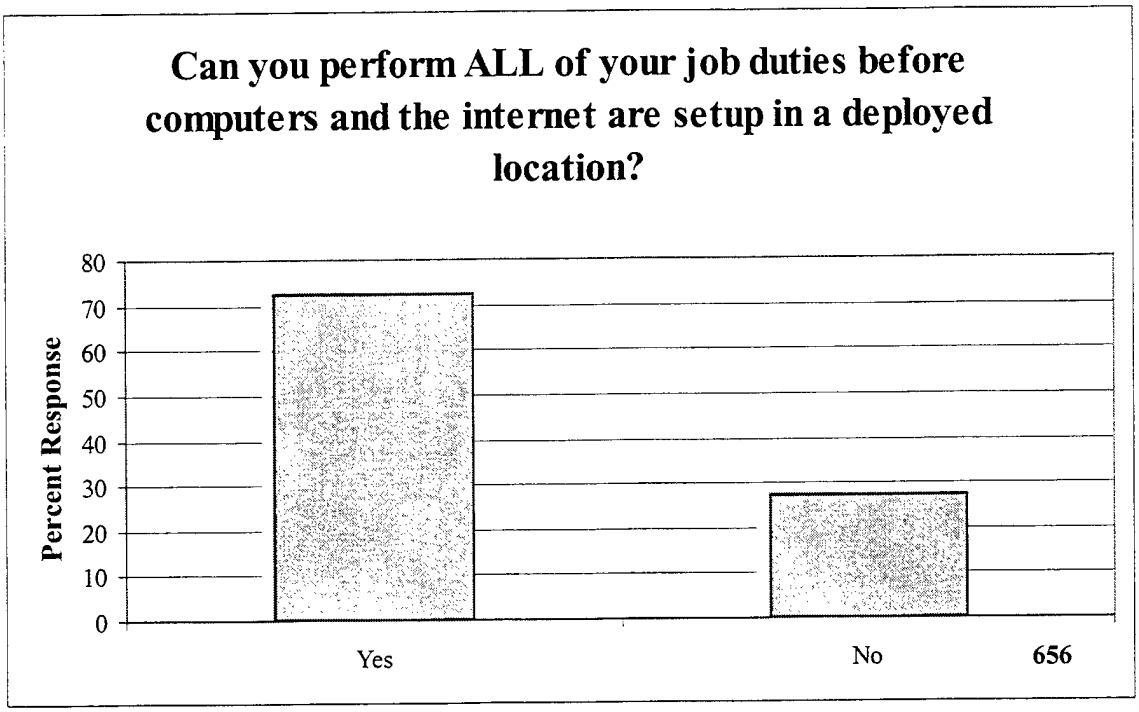
Deployment Section



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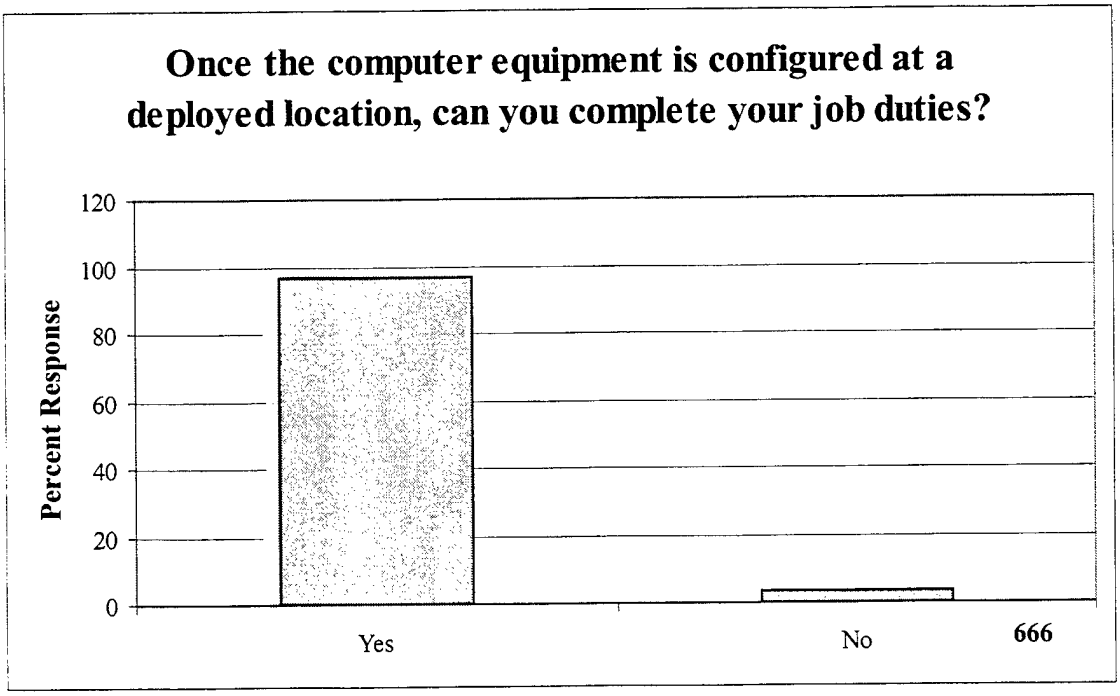

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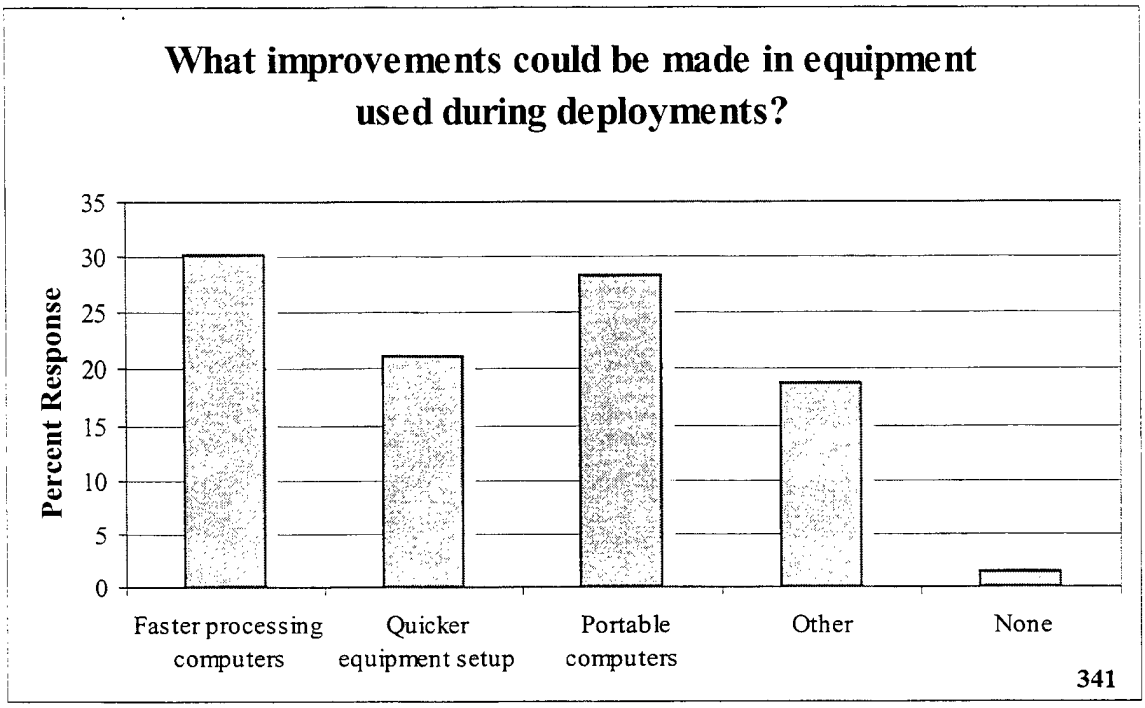
Deployment Section



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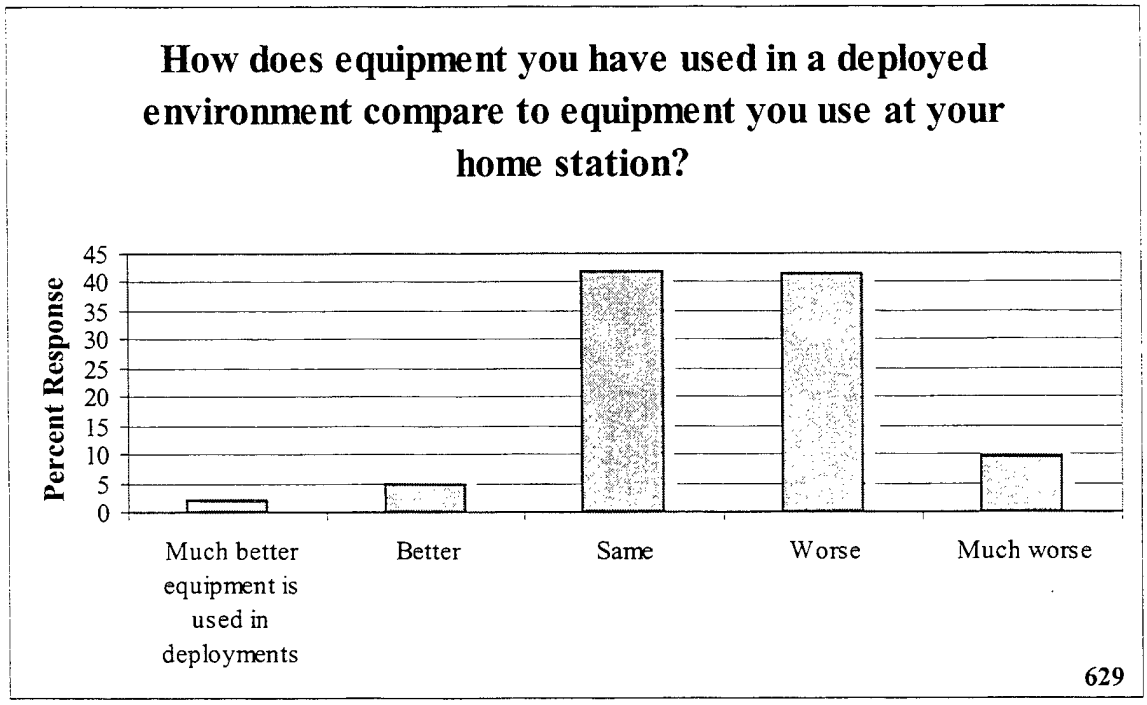
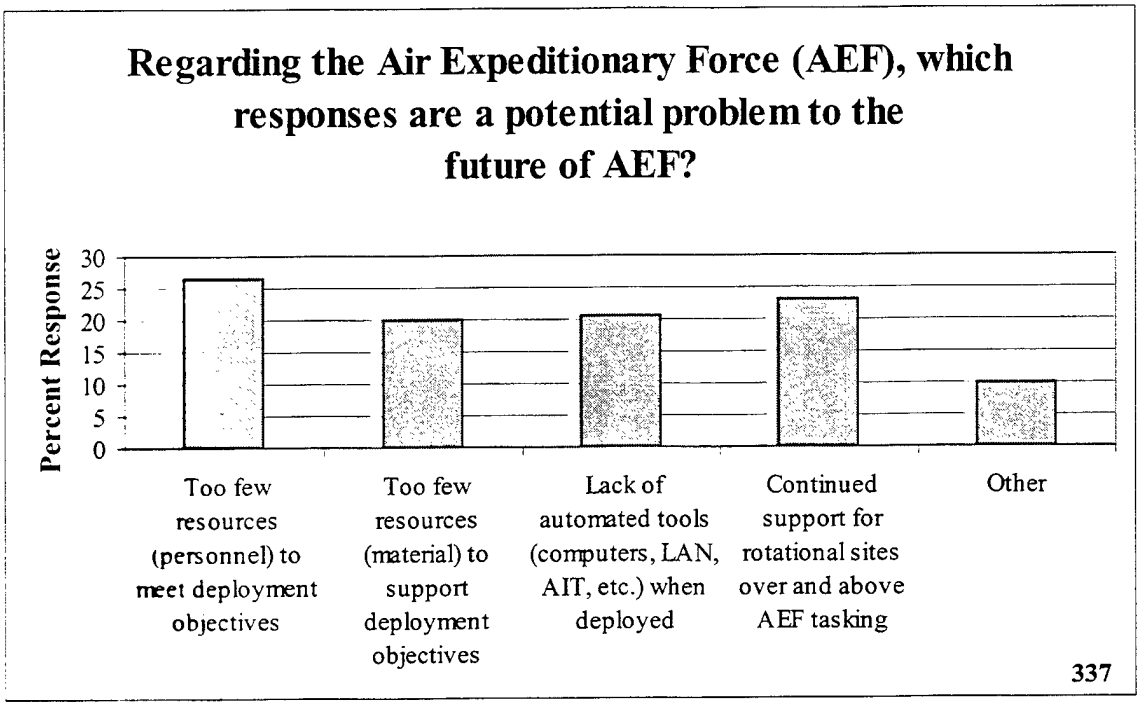


Figure A 5. 6

Deployment Section



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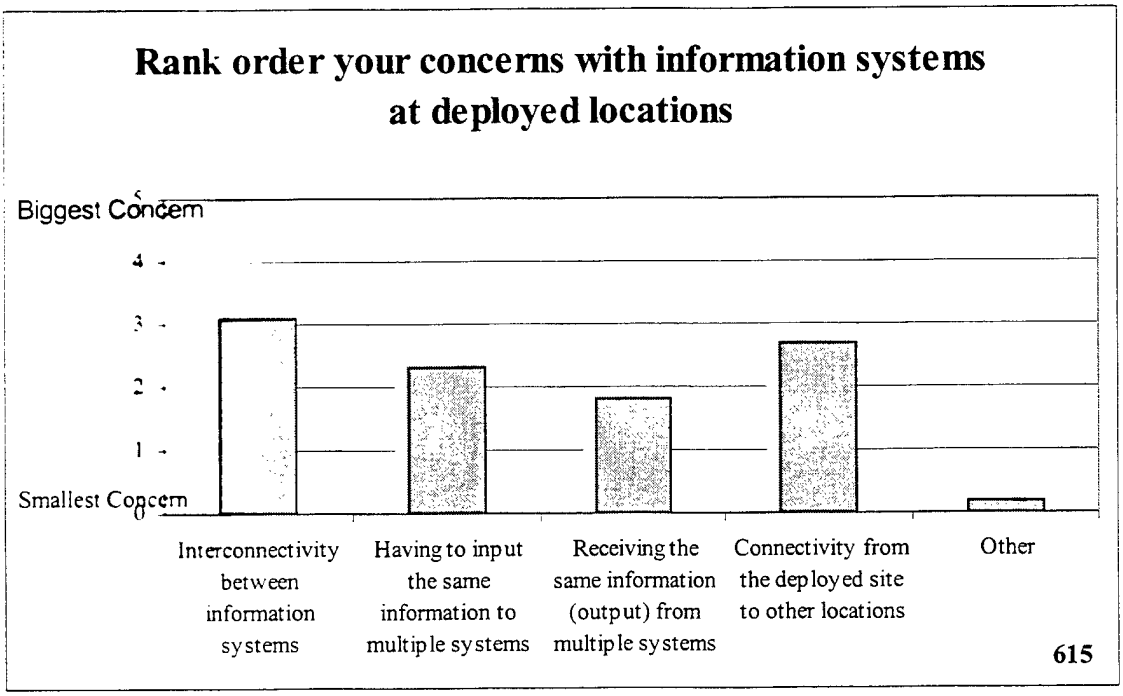


Figure A 5. 8

CLIMATE FOR DEPLOYMENT SECTION
708 Participants Given Opportunity To Respond

Climate For Deployment Section

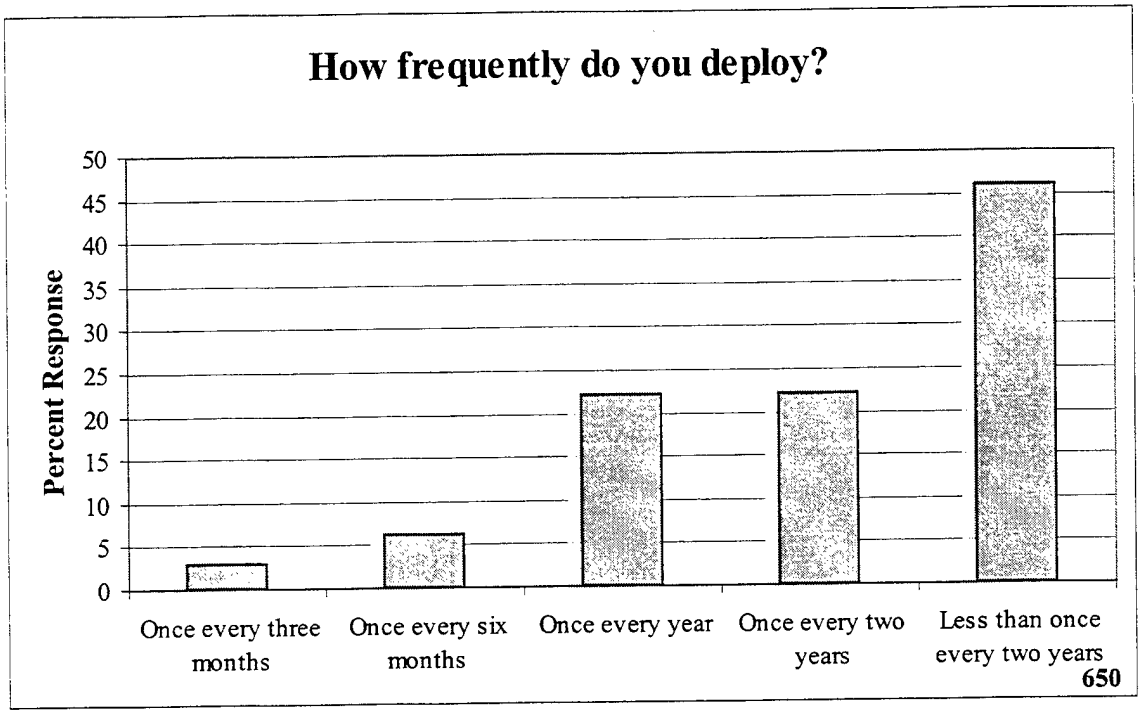


Figure A 6. 1

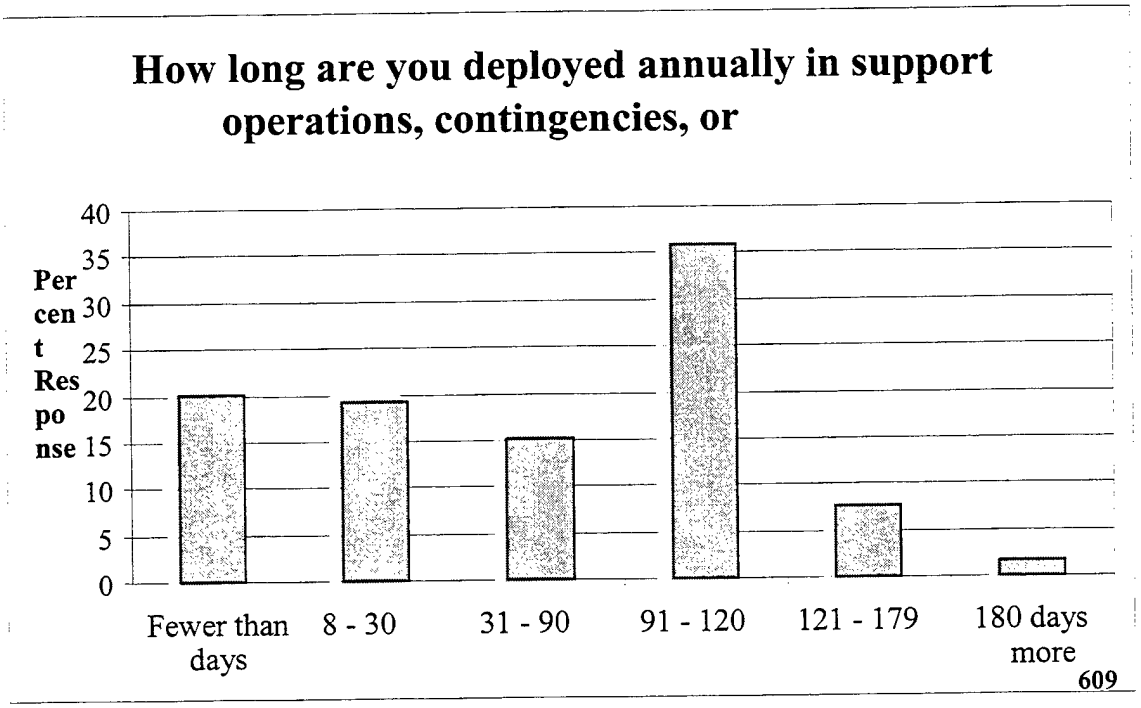


Figure A 6. 2

Climate For Deployment Section

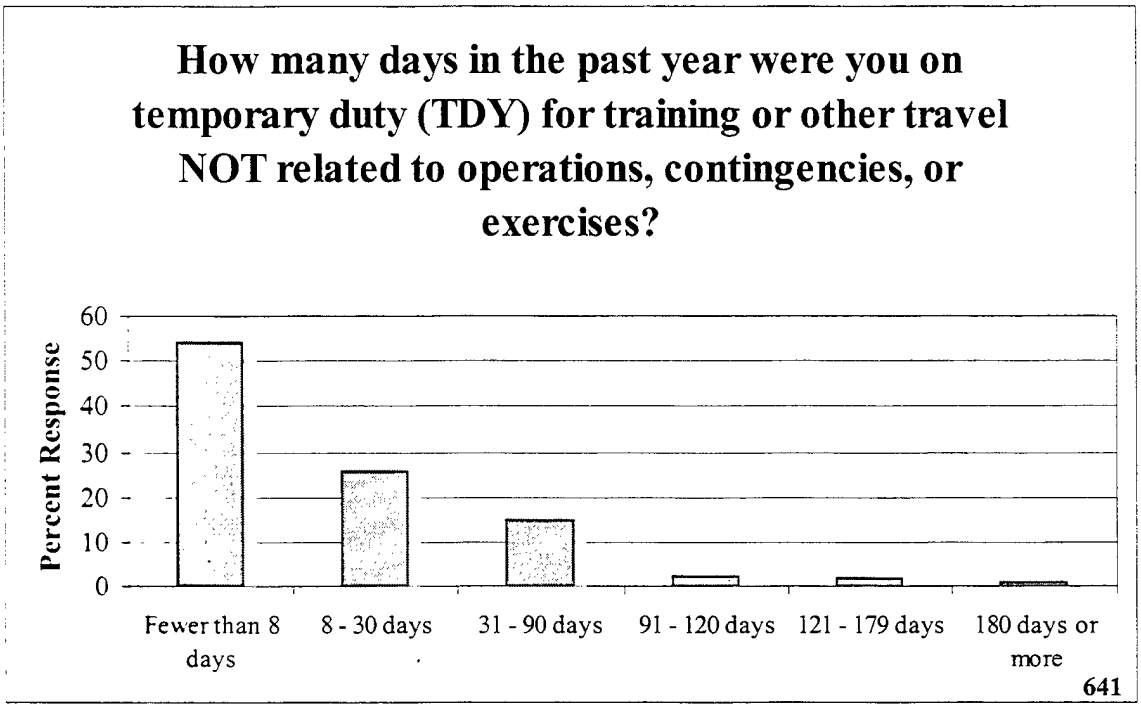


Figure A 6. 3

Training Section

1163 participants given opportunity to respond

Training Section

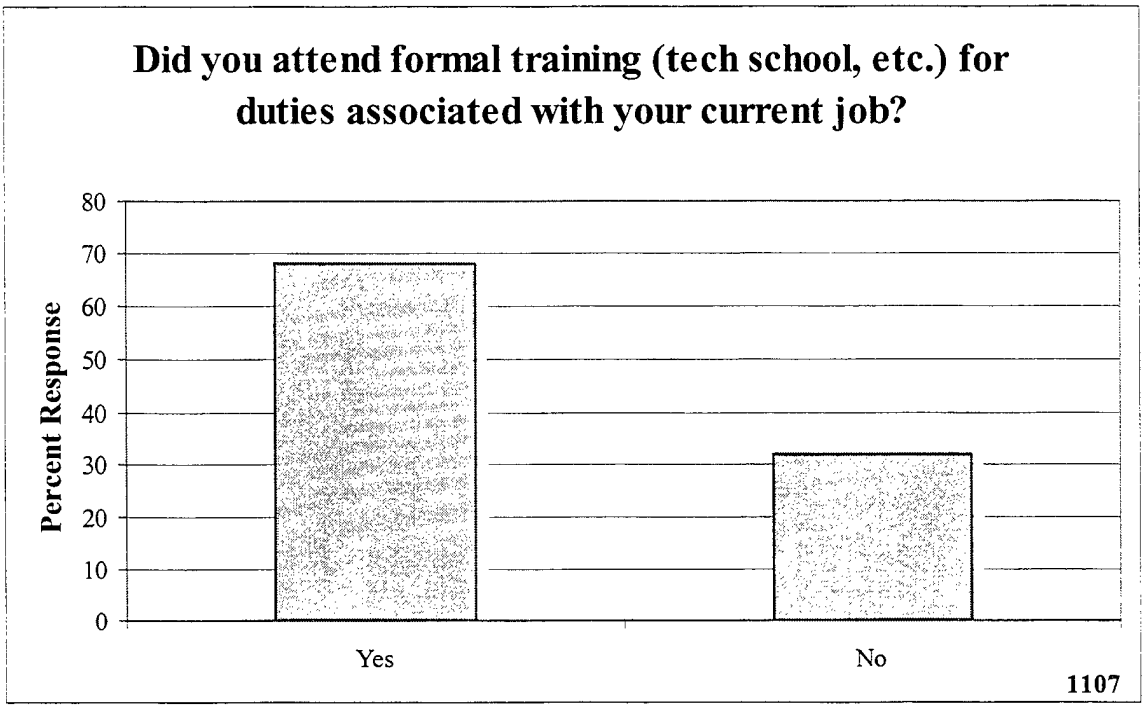


Figure A 7. 1

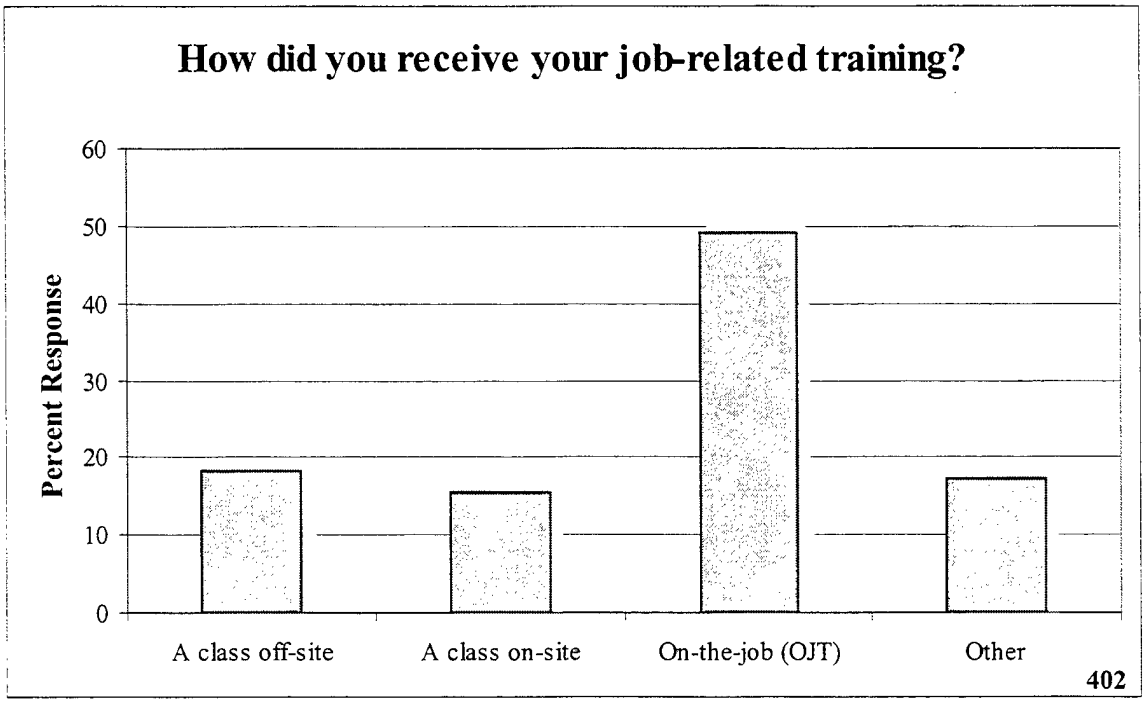
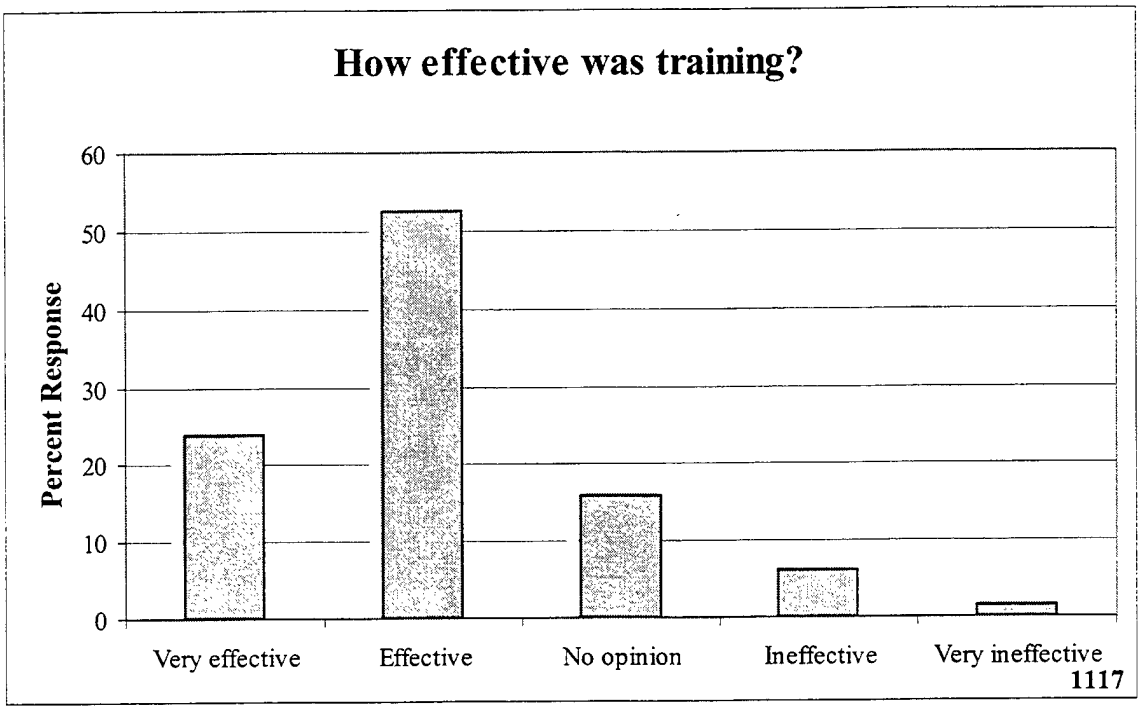


Figure A 7. 2

Training Section



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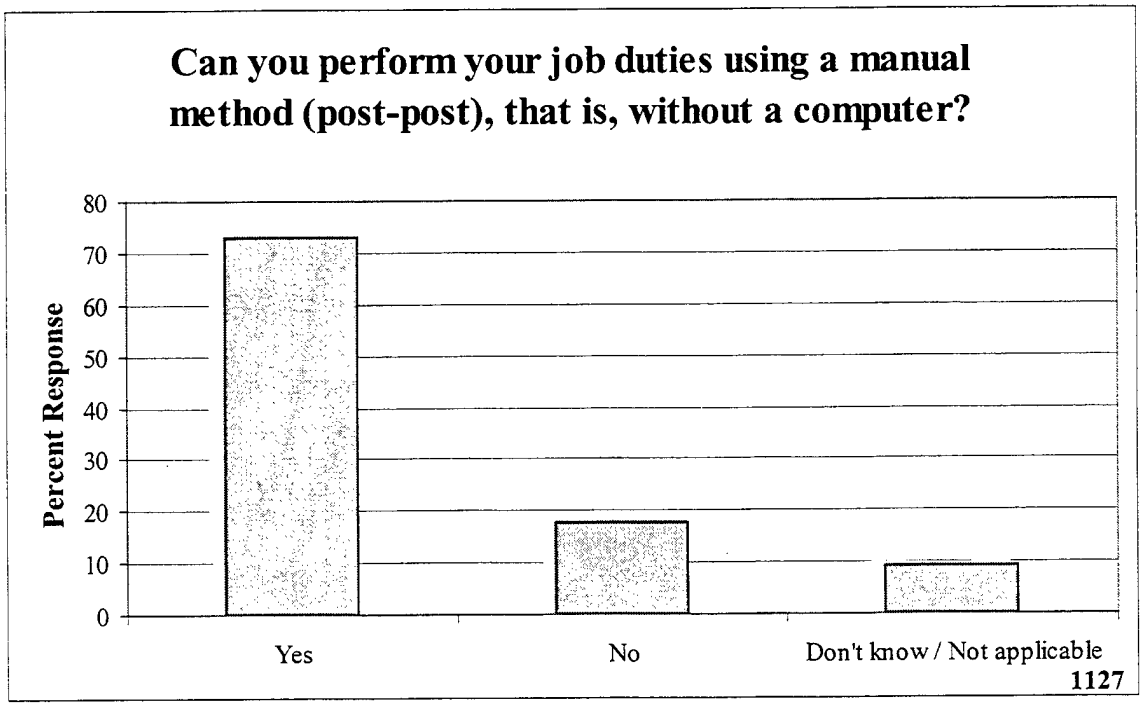
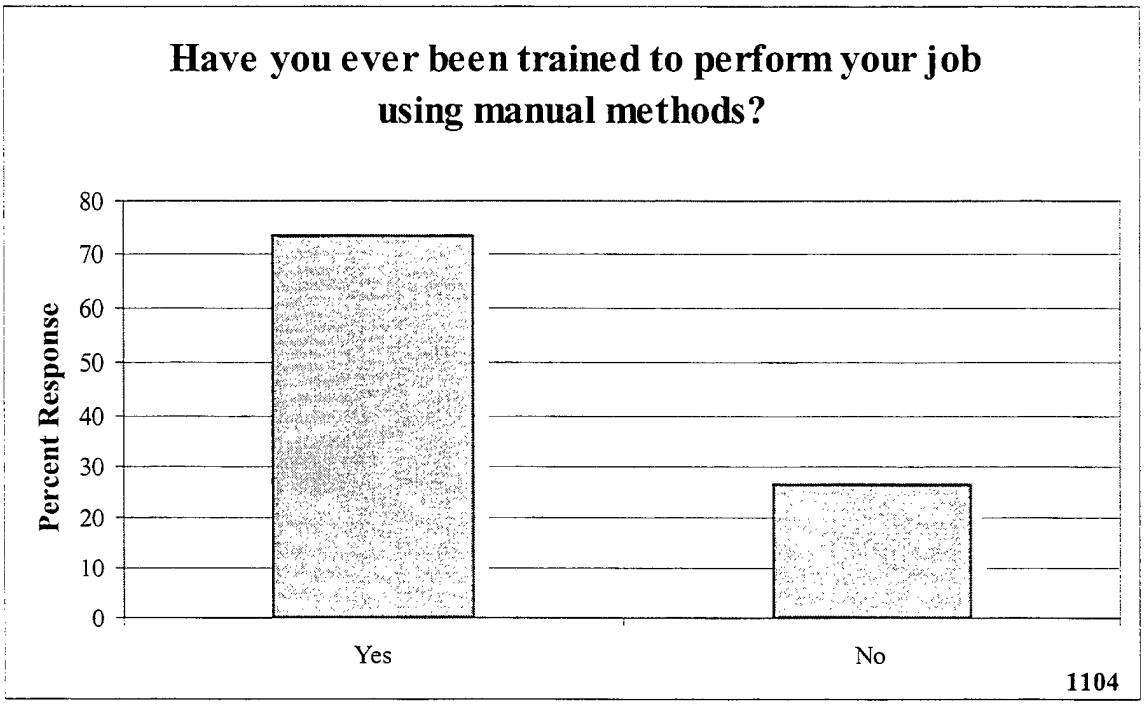


Figure A 7. 4

Training Section



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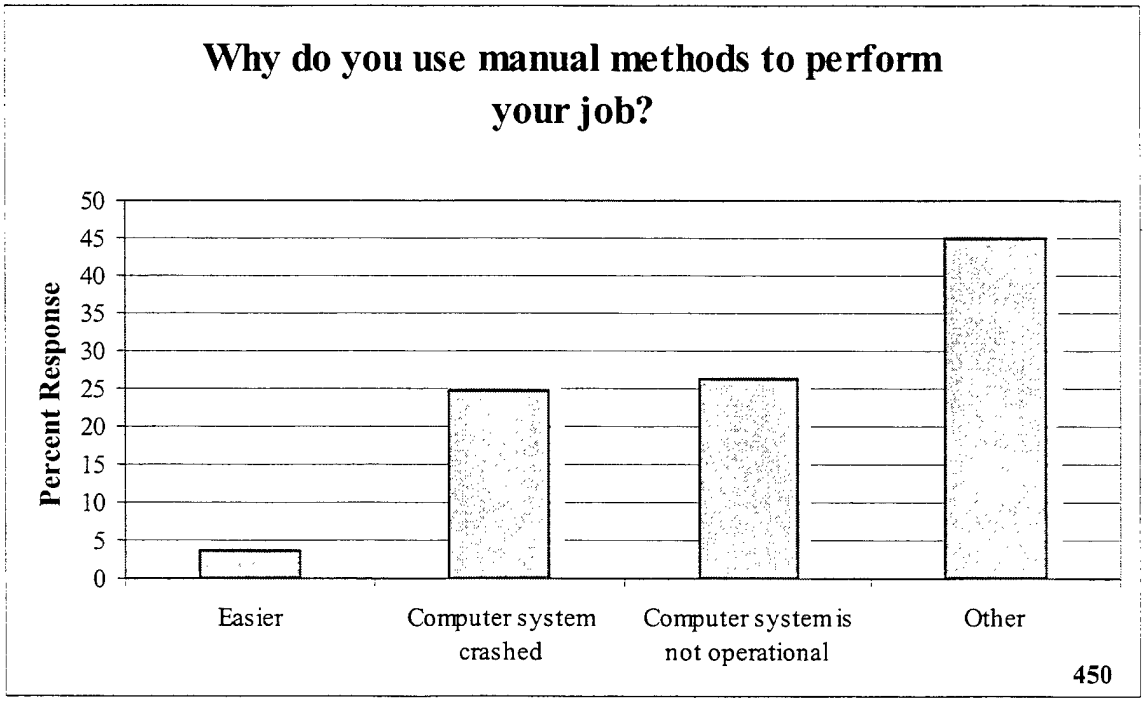


Figure A 7. 6

Training Section

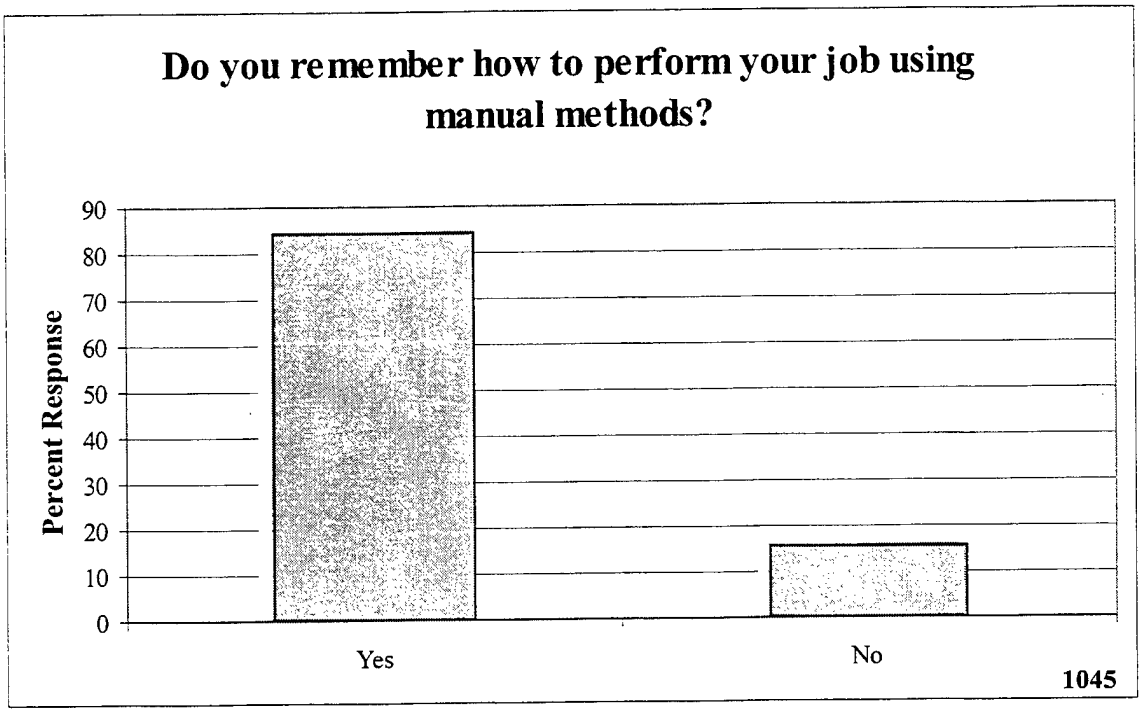


Figure A 7. 7

Main Section

1163 Participants Given Opportunity To Respond

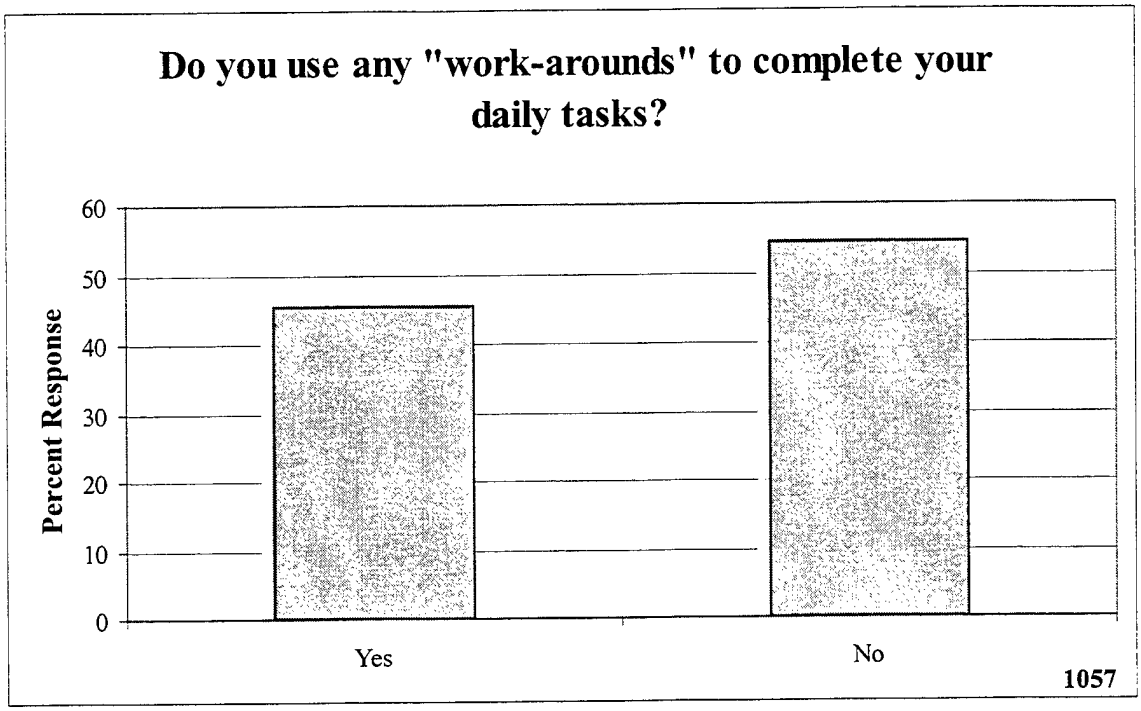
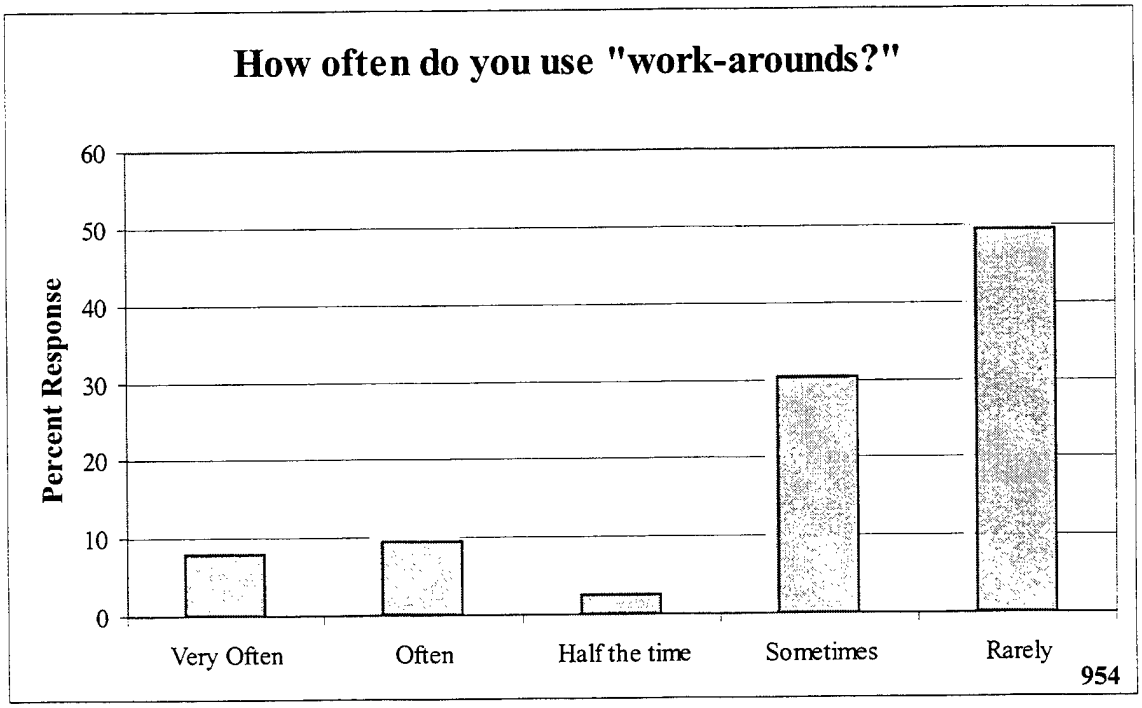


Figure A 8. 1



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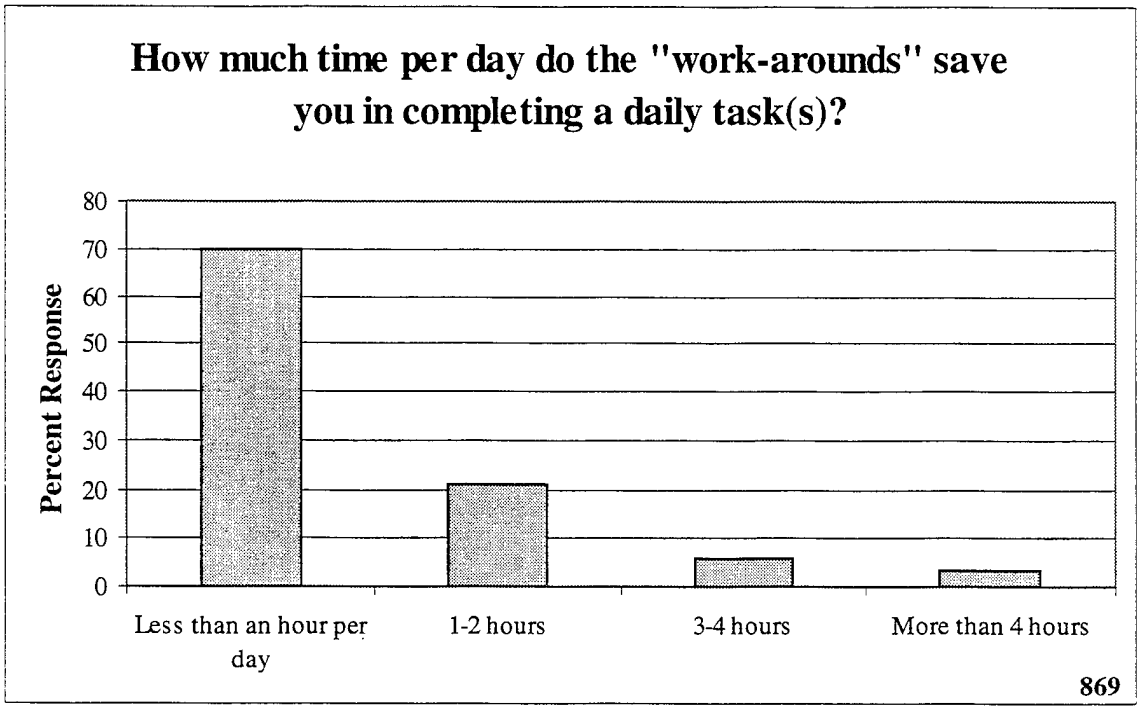

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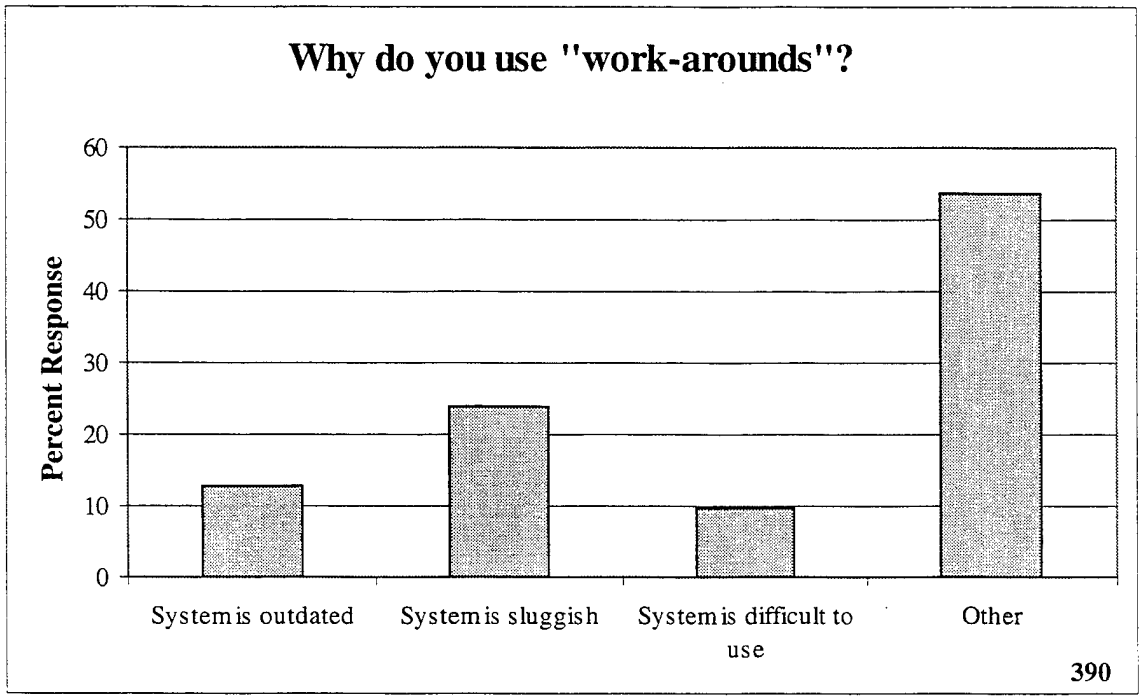

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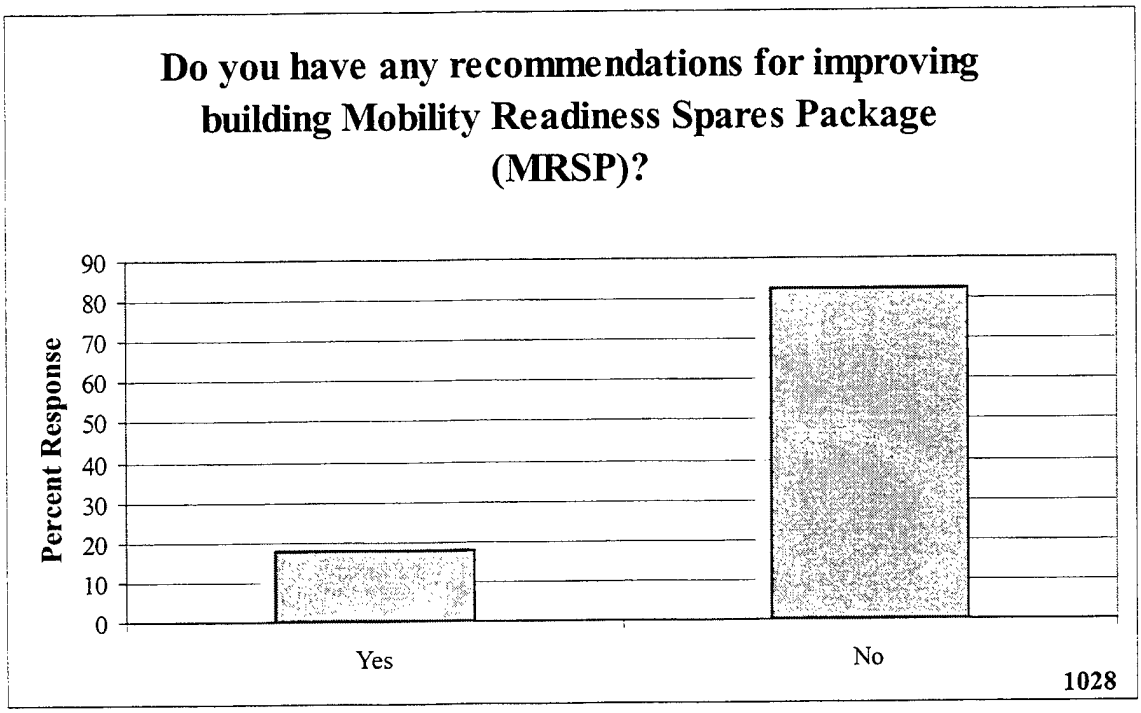
Main Section



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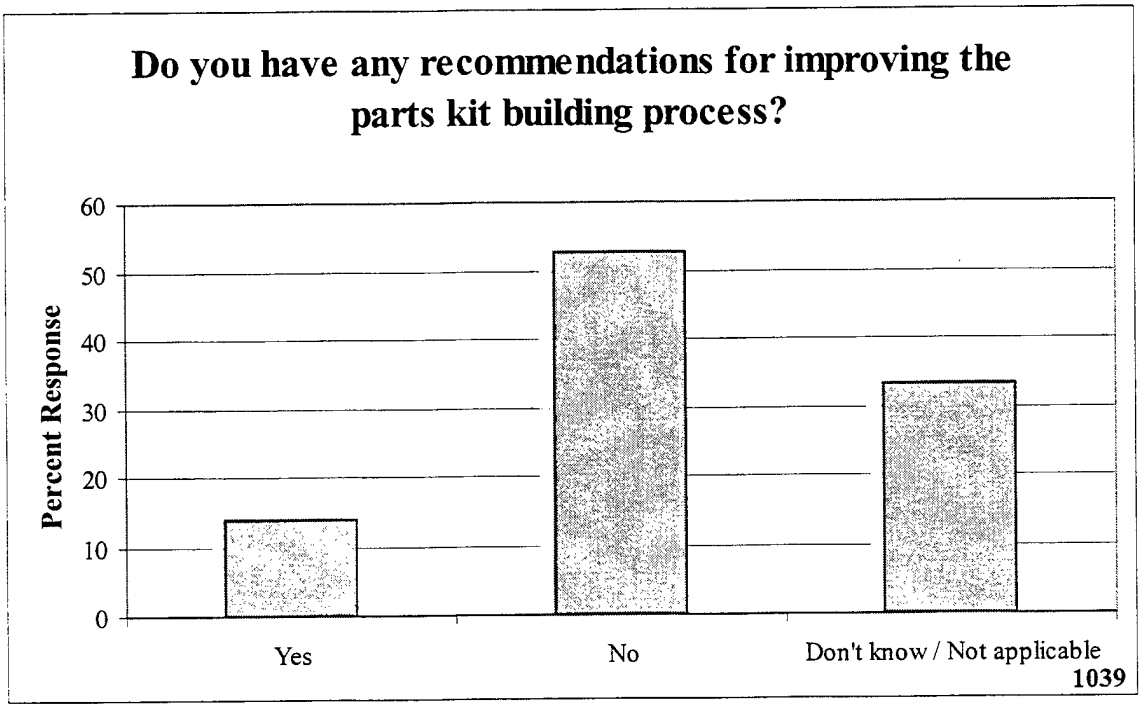


Figure A 8. 6

Information Systems Section

1163 Participants Given Opportunity To Respond

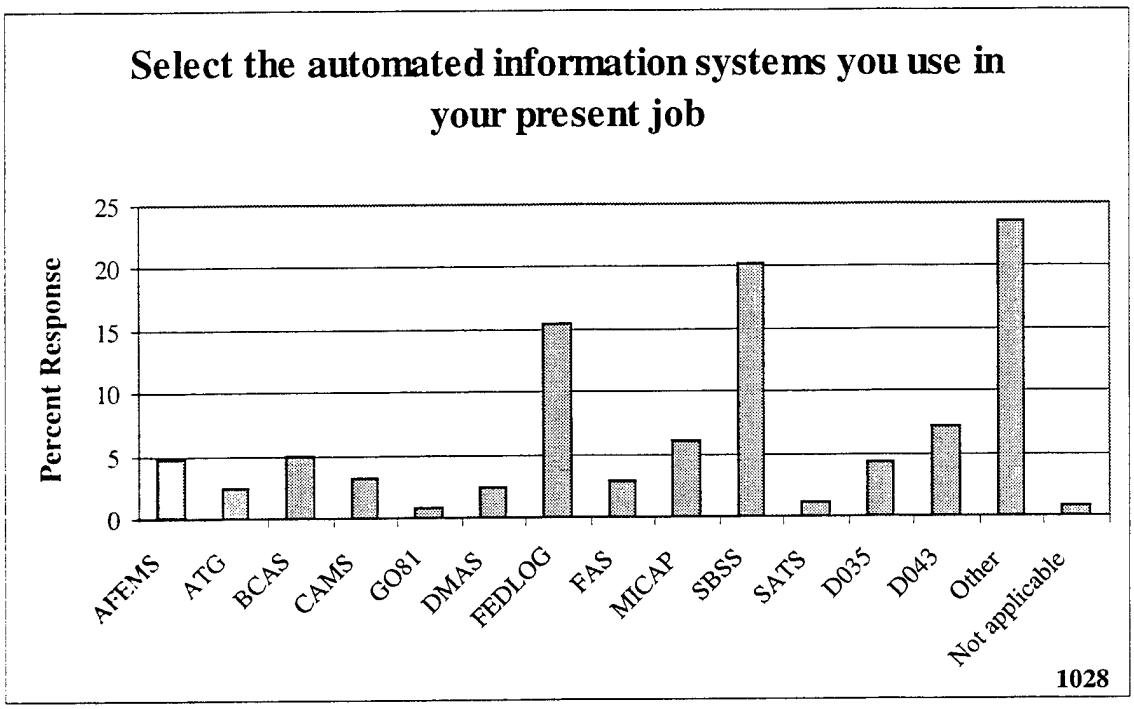


Figure A 9. 1

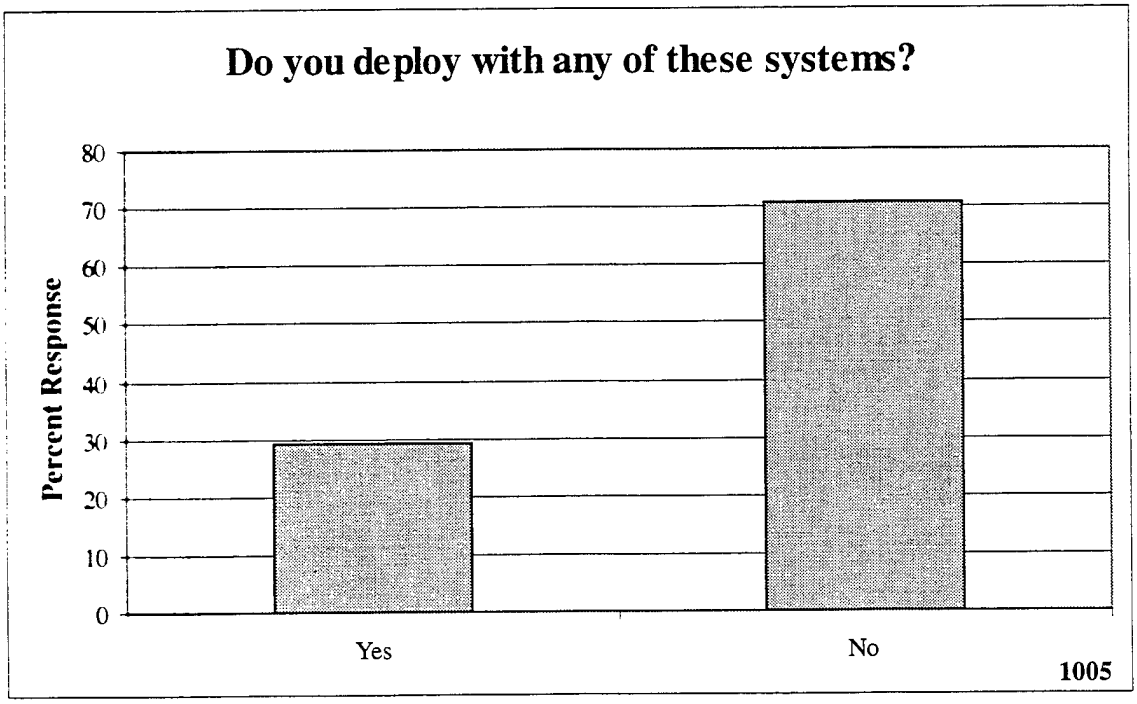


Figure A 9. 2

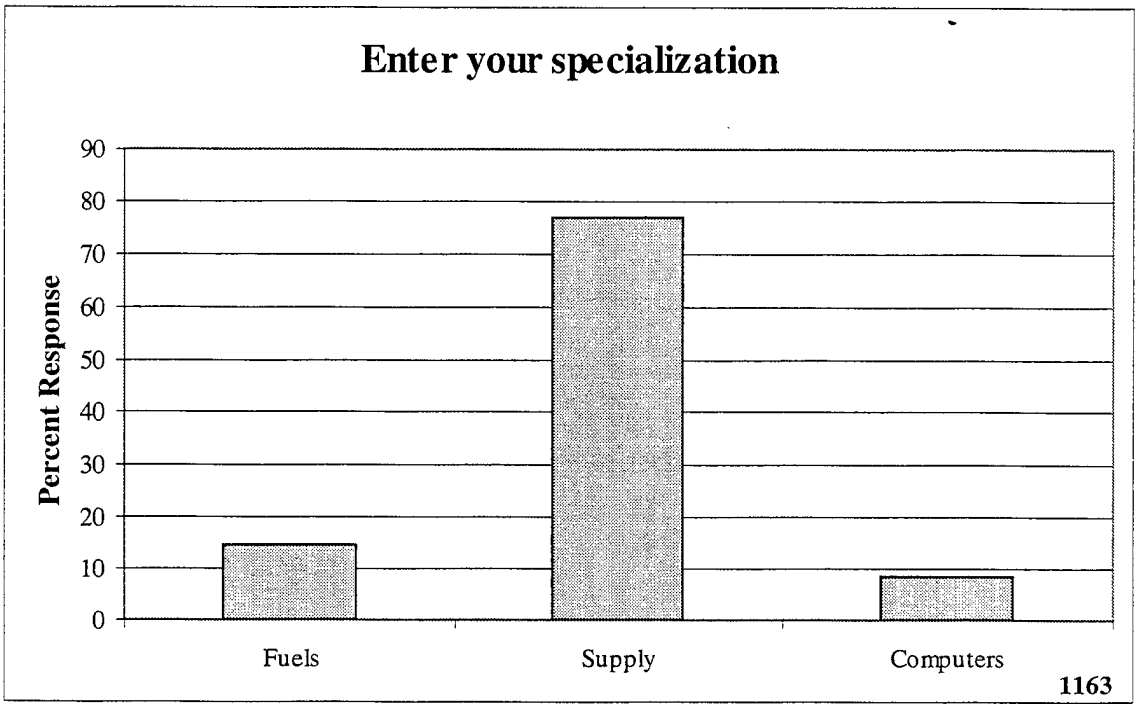


Figure A 9. 3

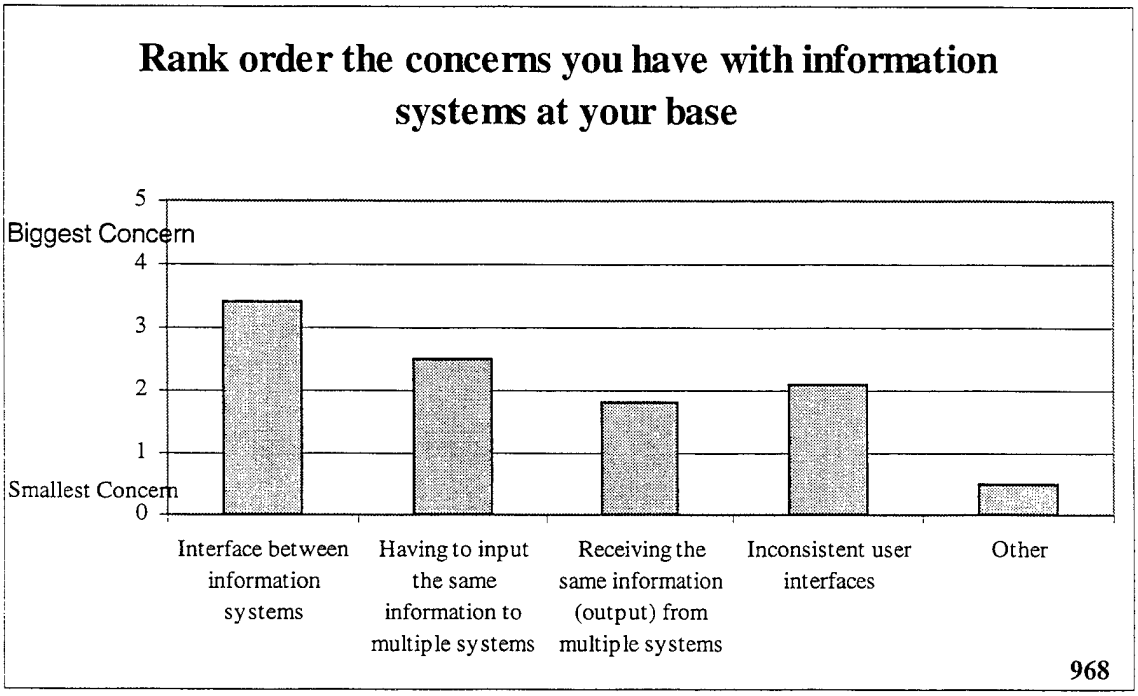


Figure A 9. 4

Fuels Section

171 Participants Given Opportunity To Respond

Fuels Section

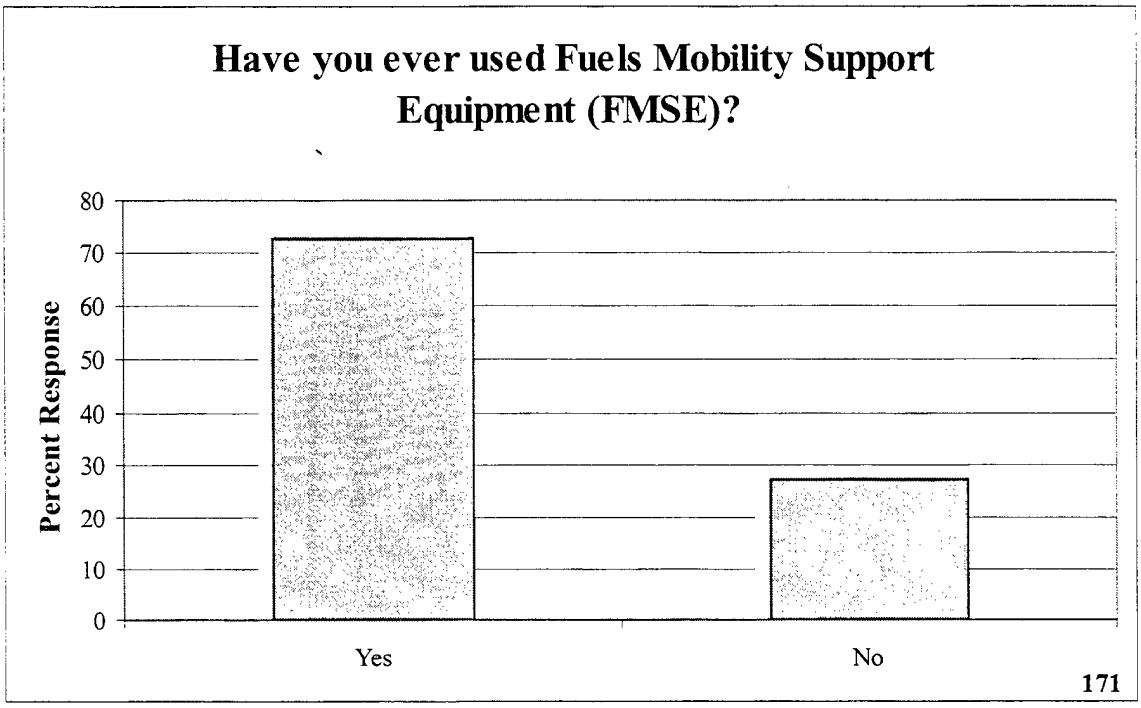
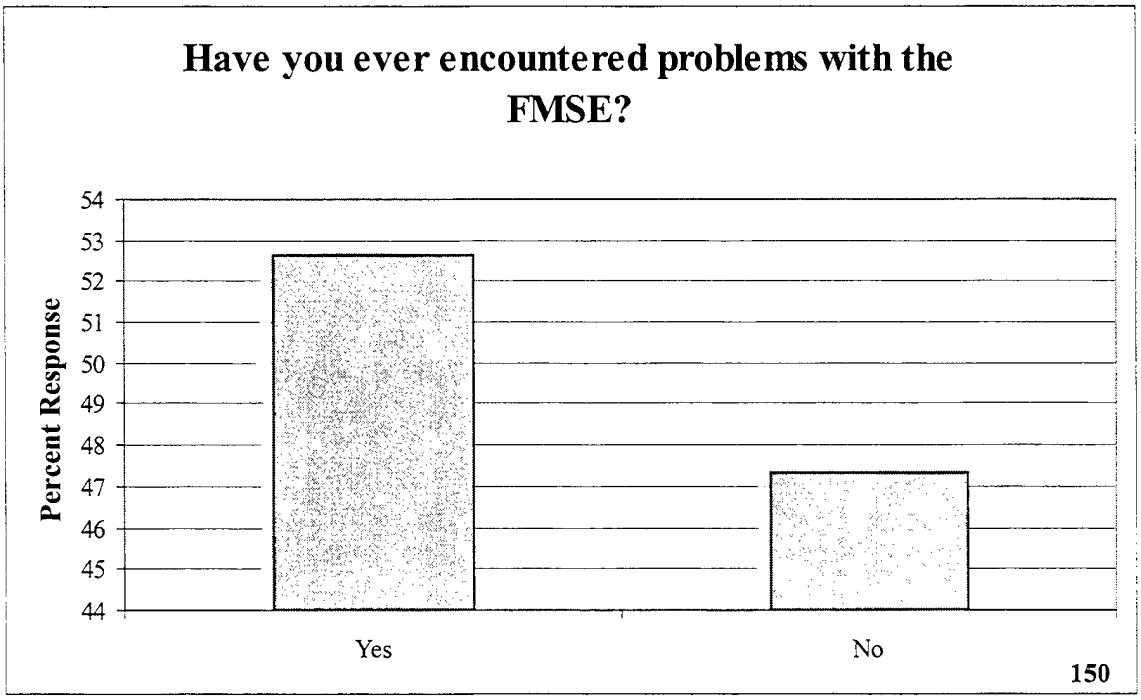


Figure A 10. 1



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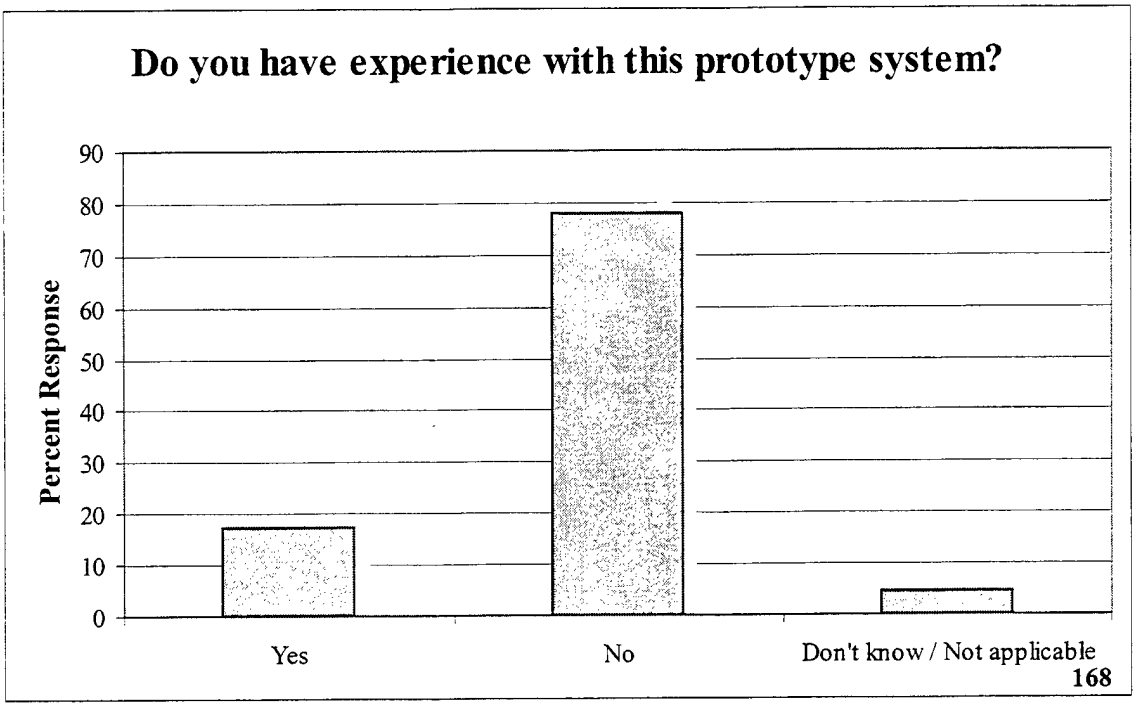

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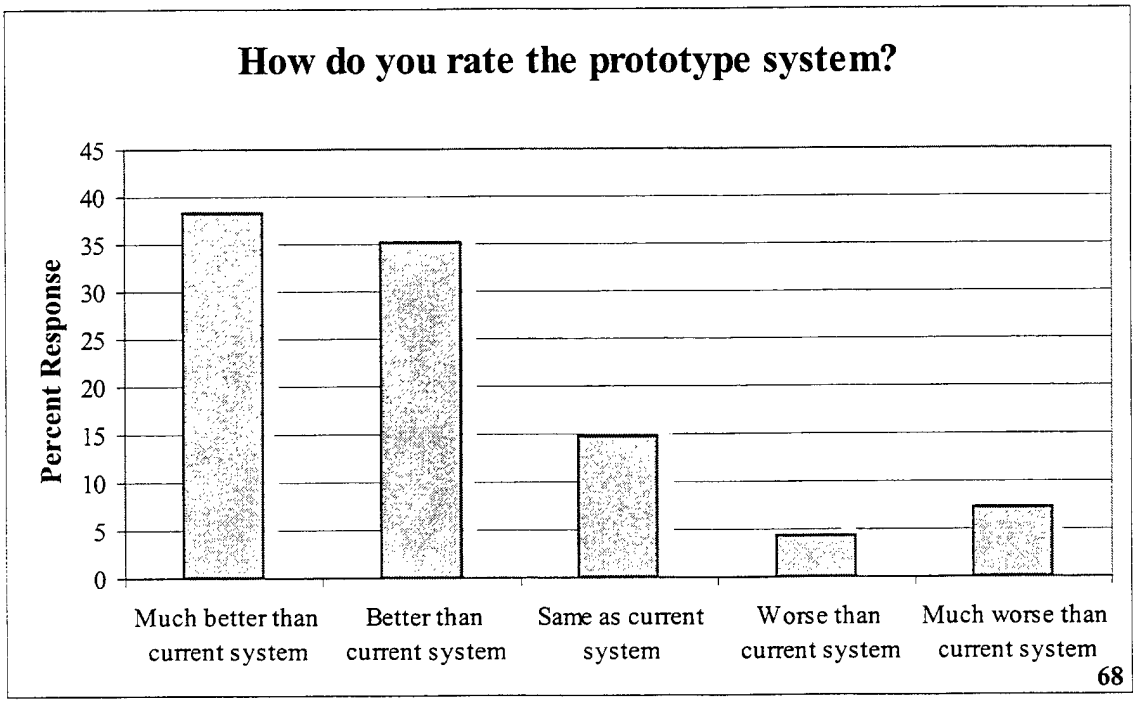
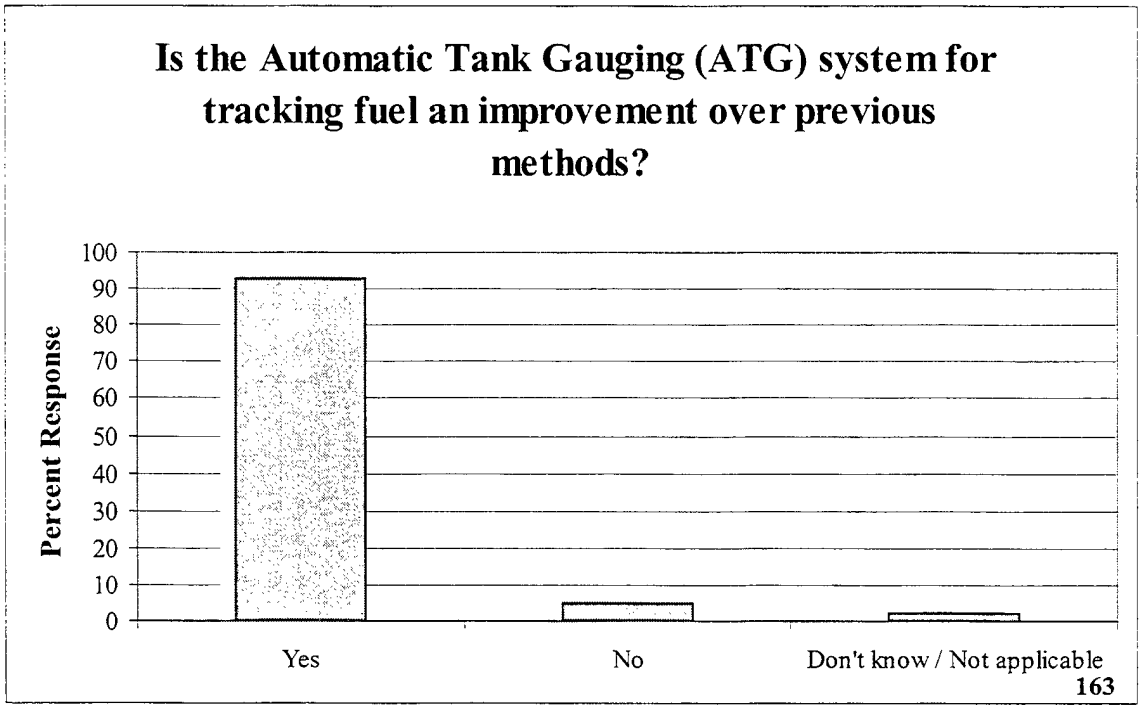


Figure A 10. 4



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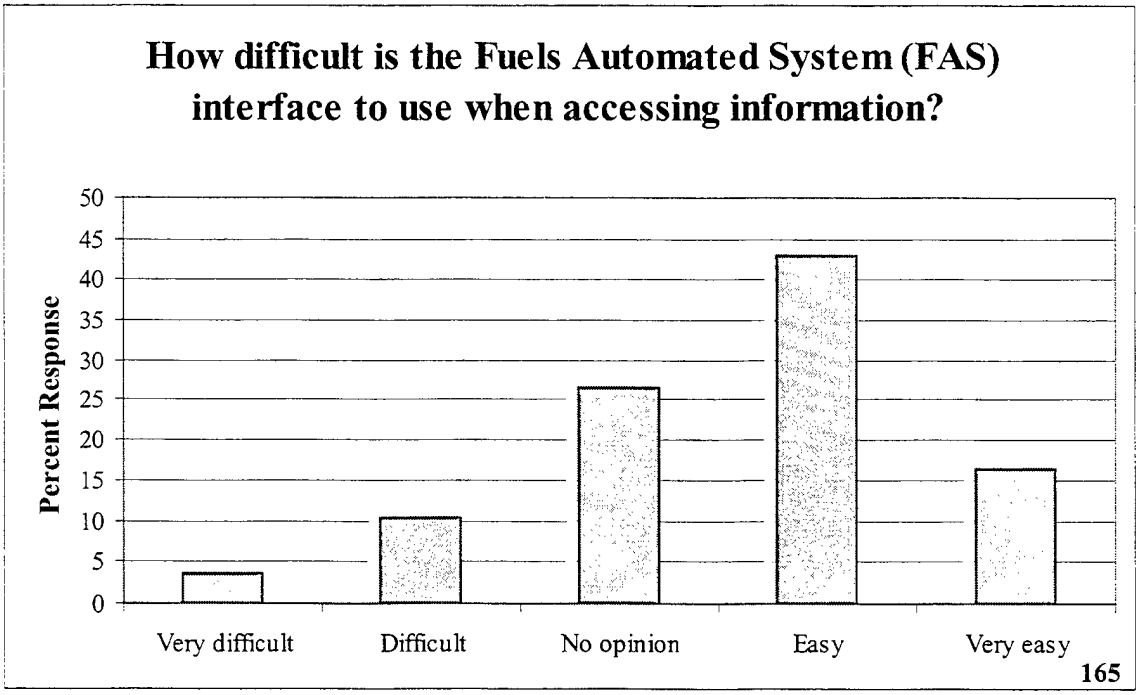

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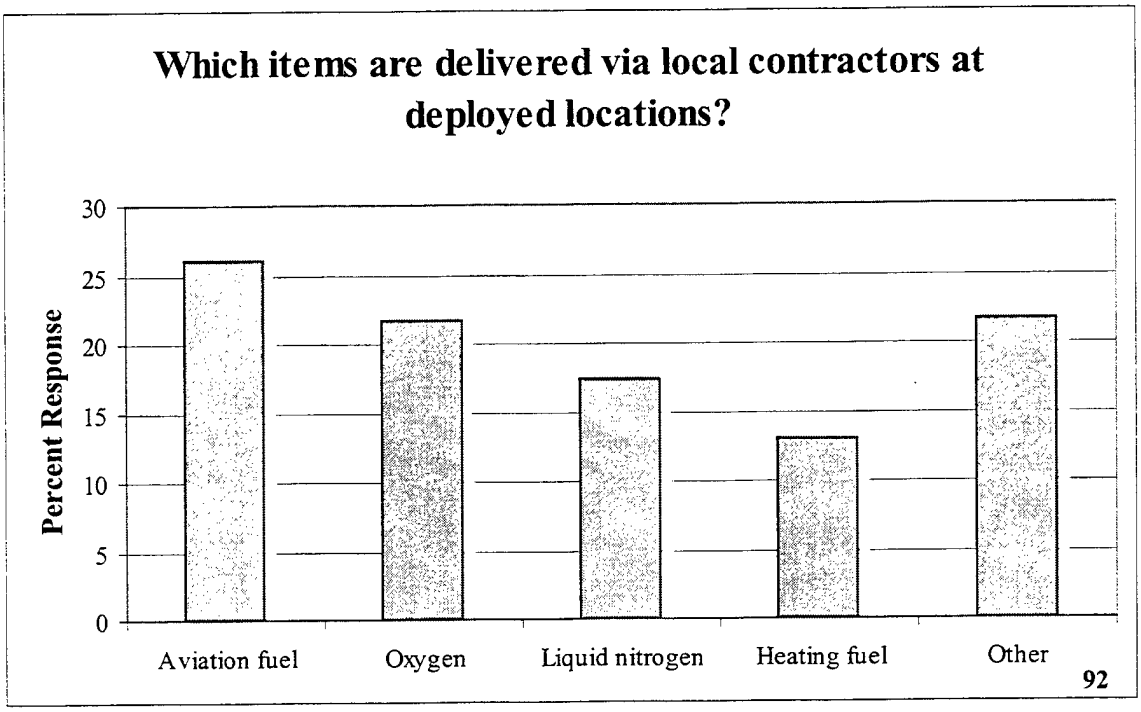

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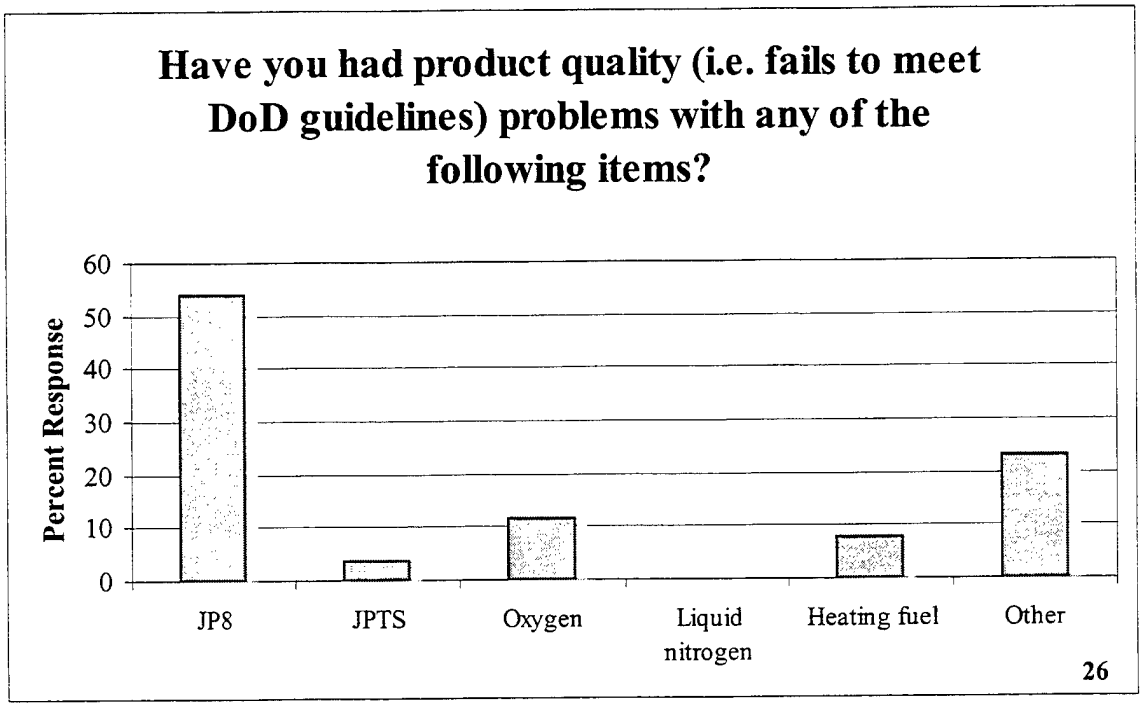
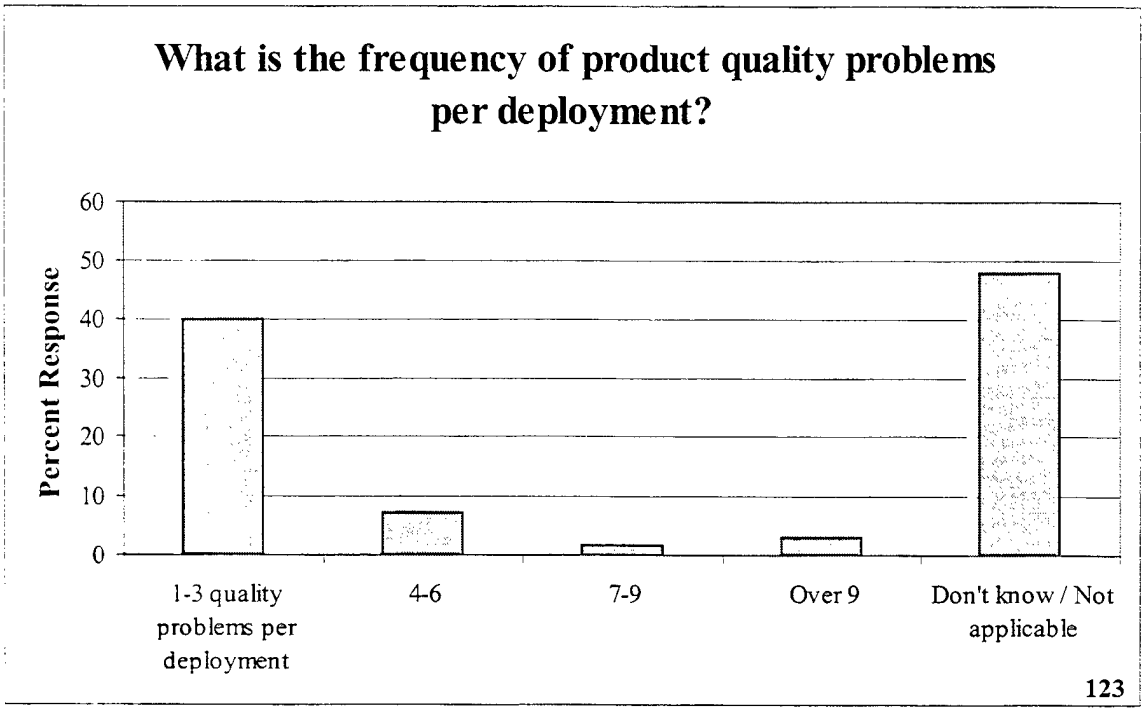


Figure A 10. 8

Fuels Section



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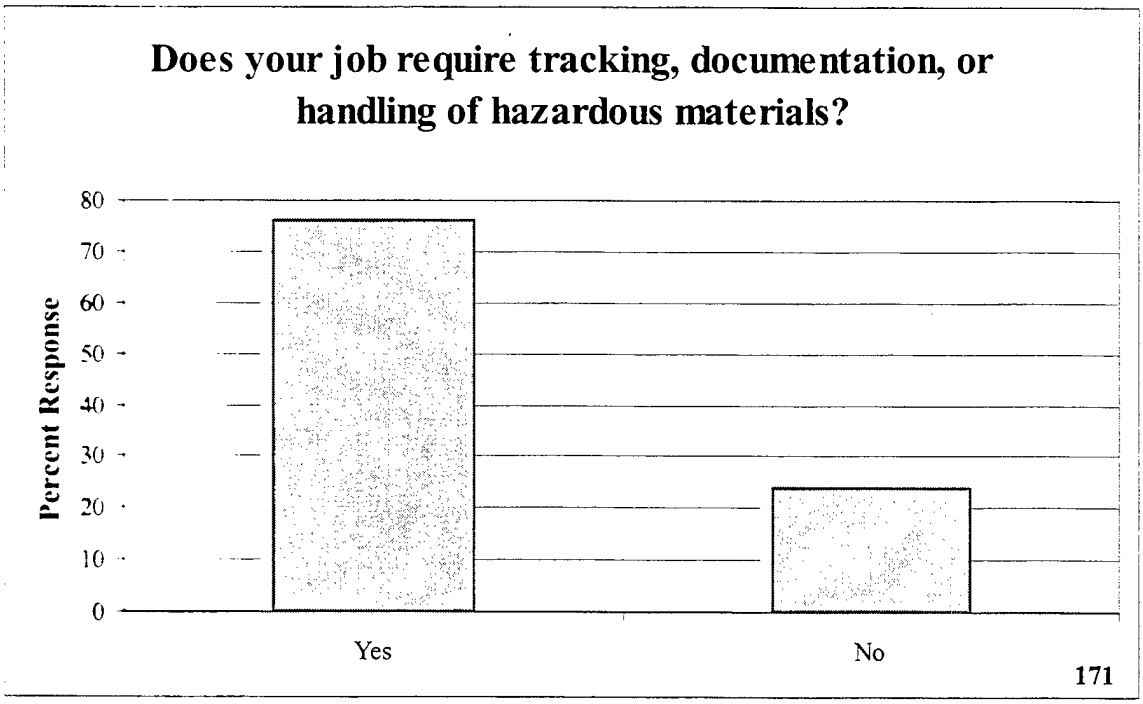

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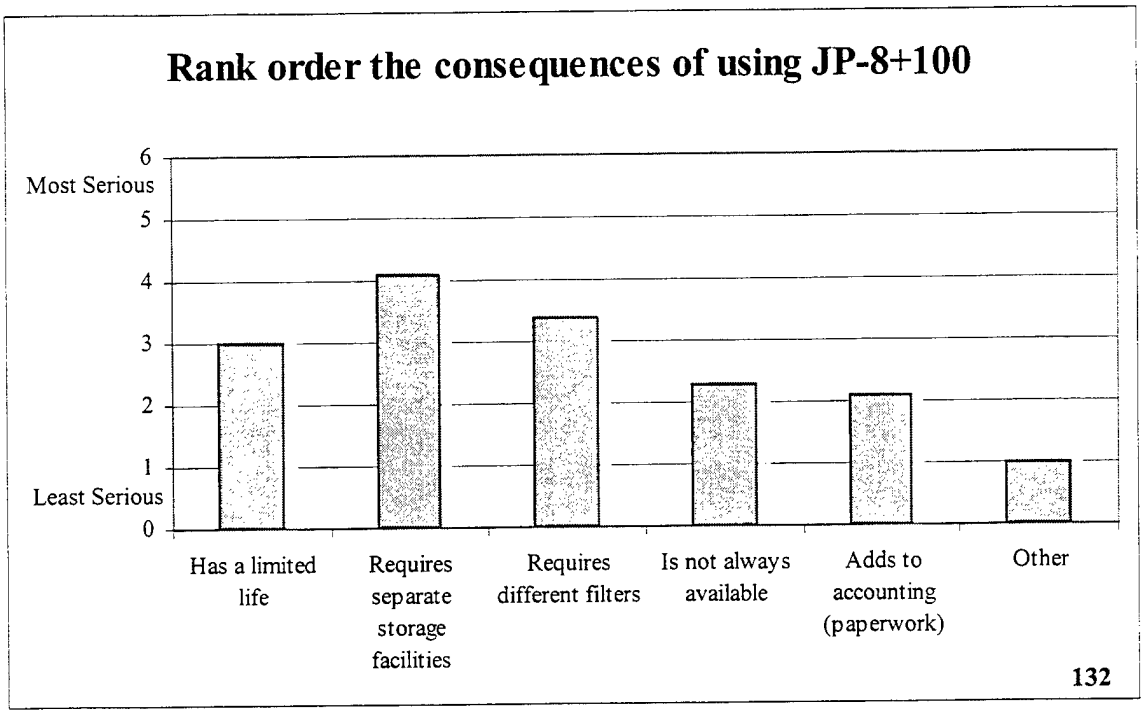


Figure A 10. 11

Supply Section
892 participants given opportunity to respond

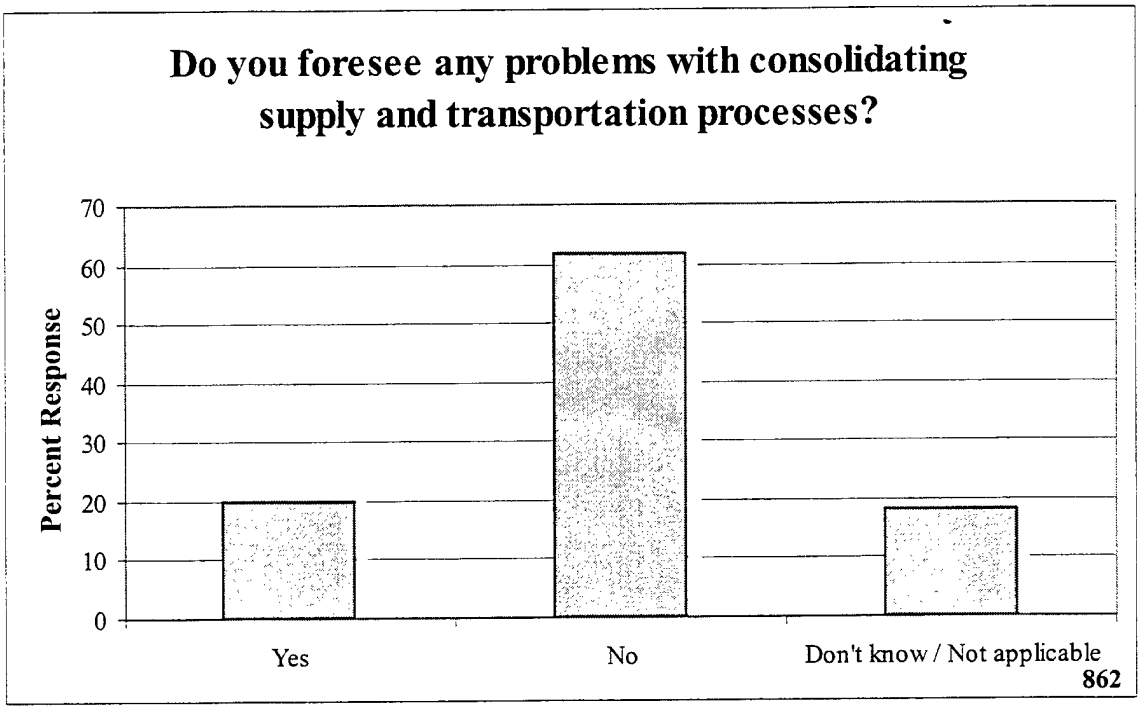


Figure A 11. 1

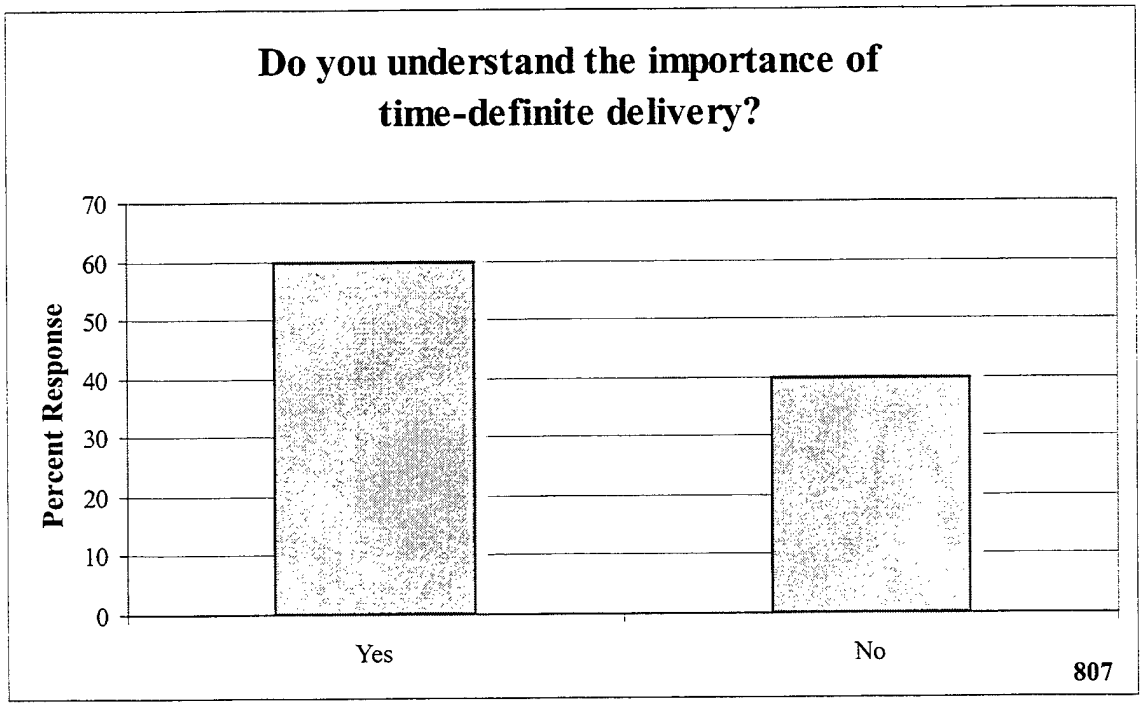
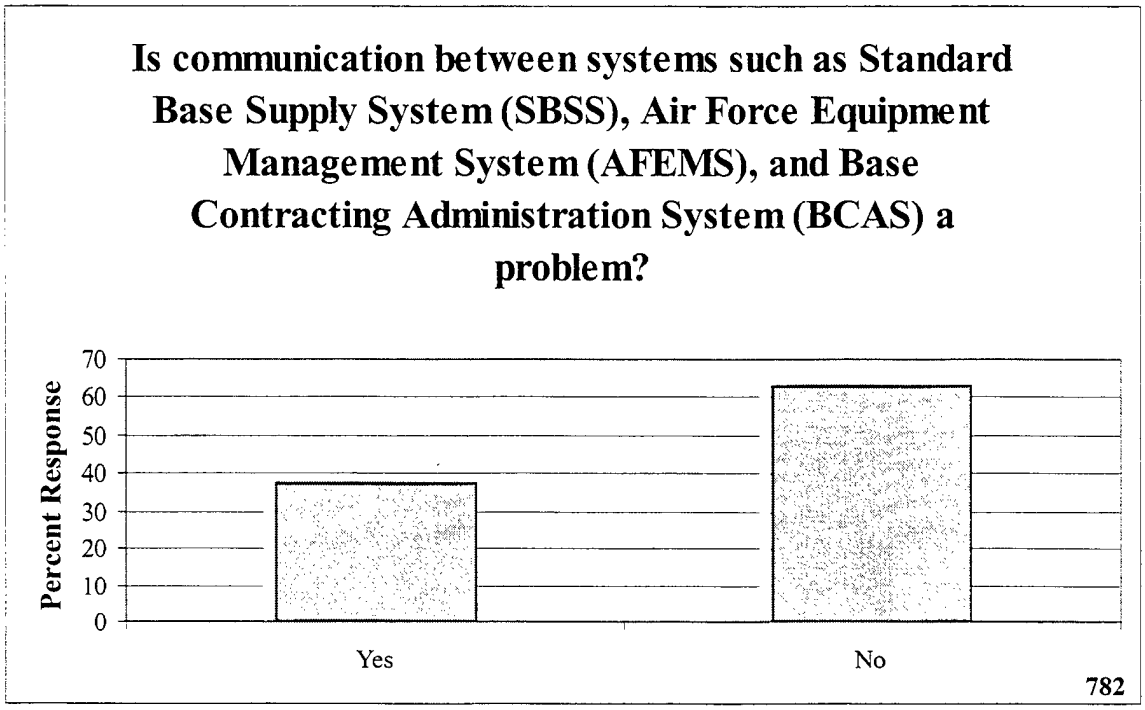


Figure A 11. 2



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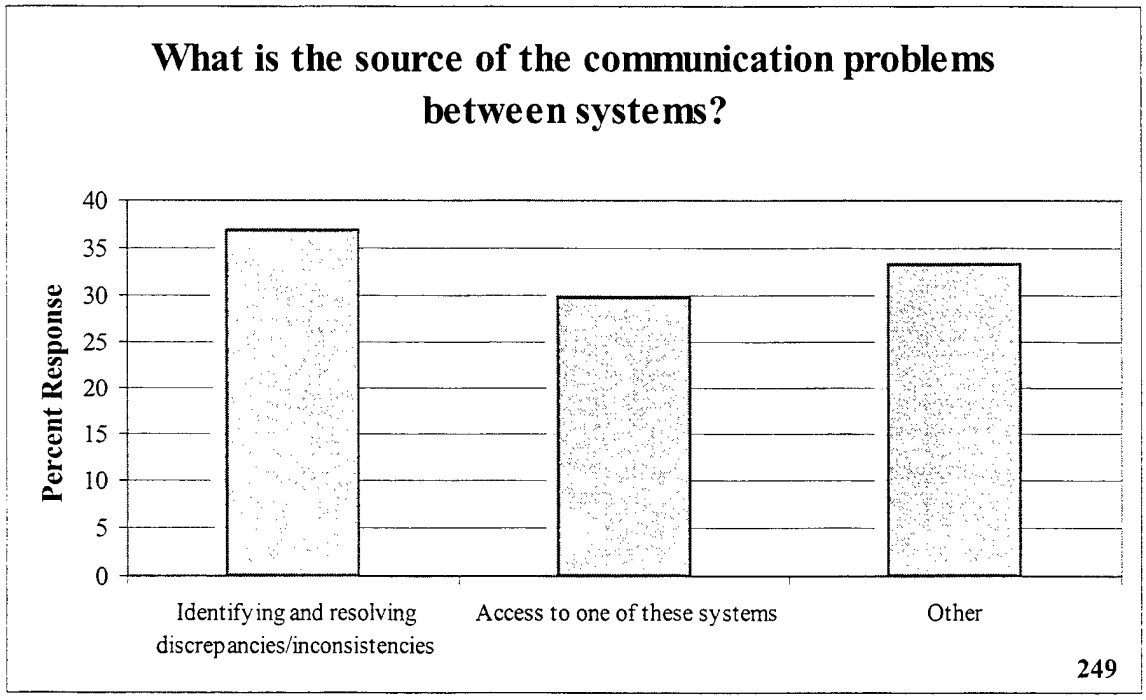


Figure A 11. 4

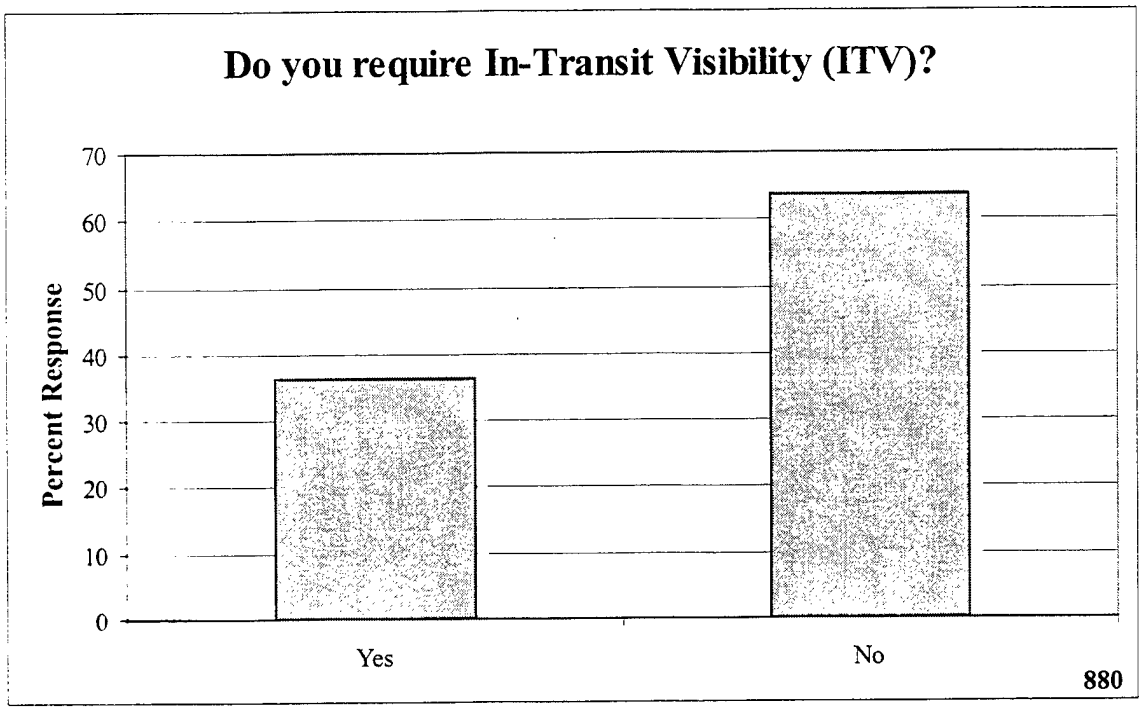


Figure A 11. 5

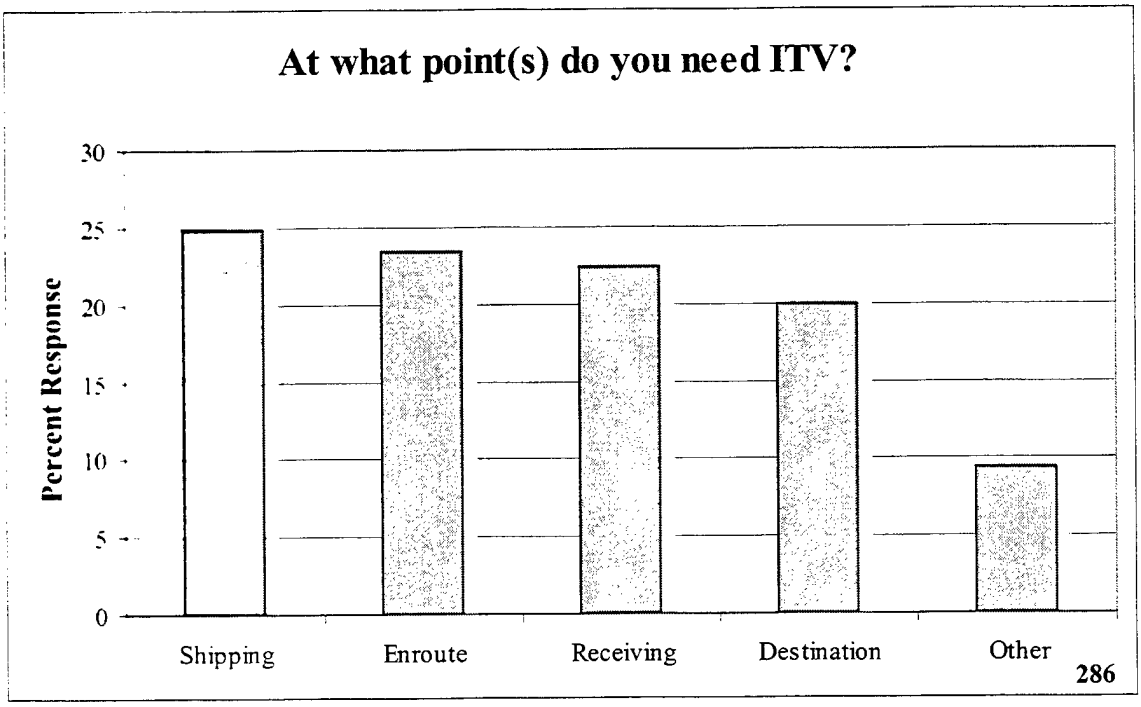


Figure A 11. 6

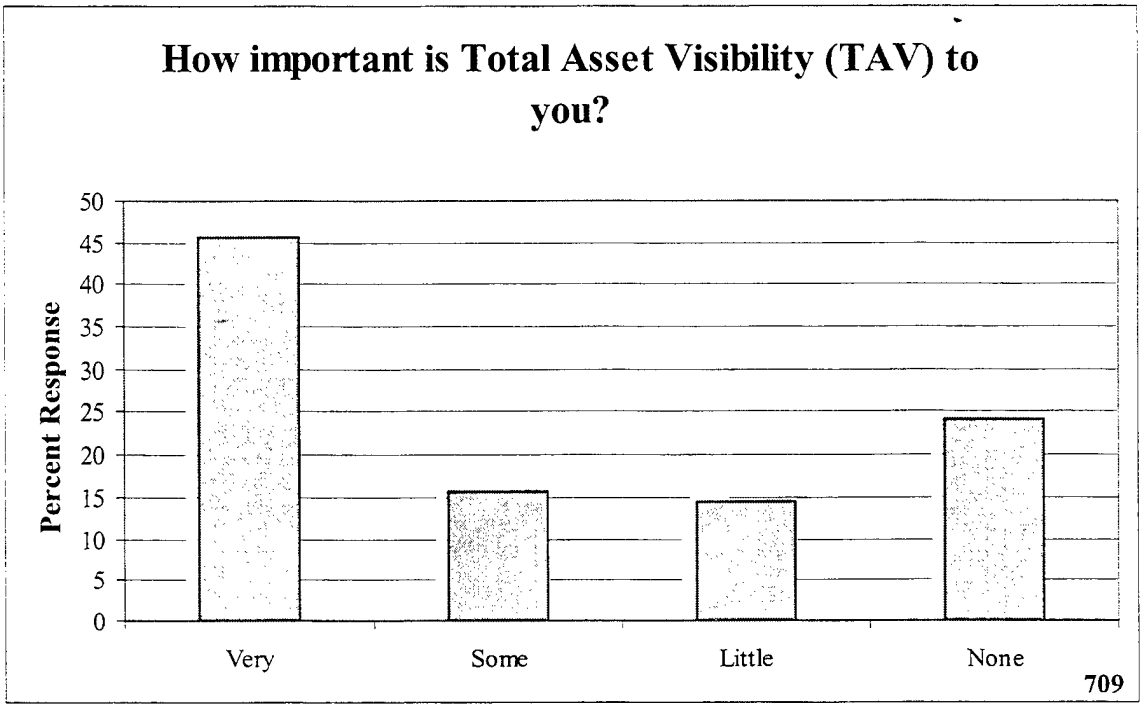


Figure A 11. 7

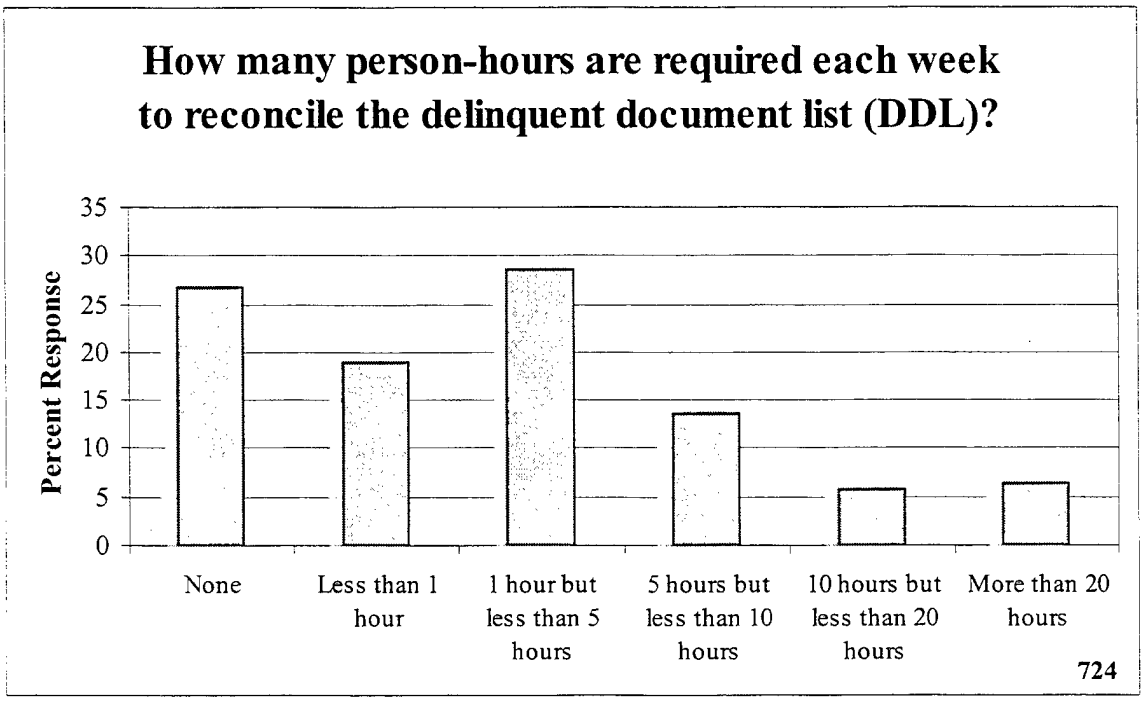
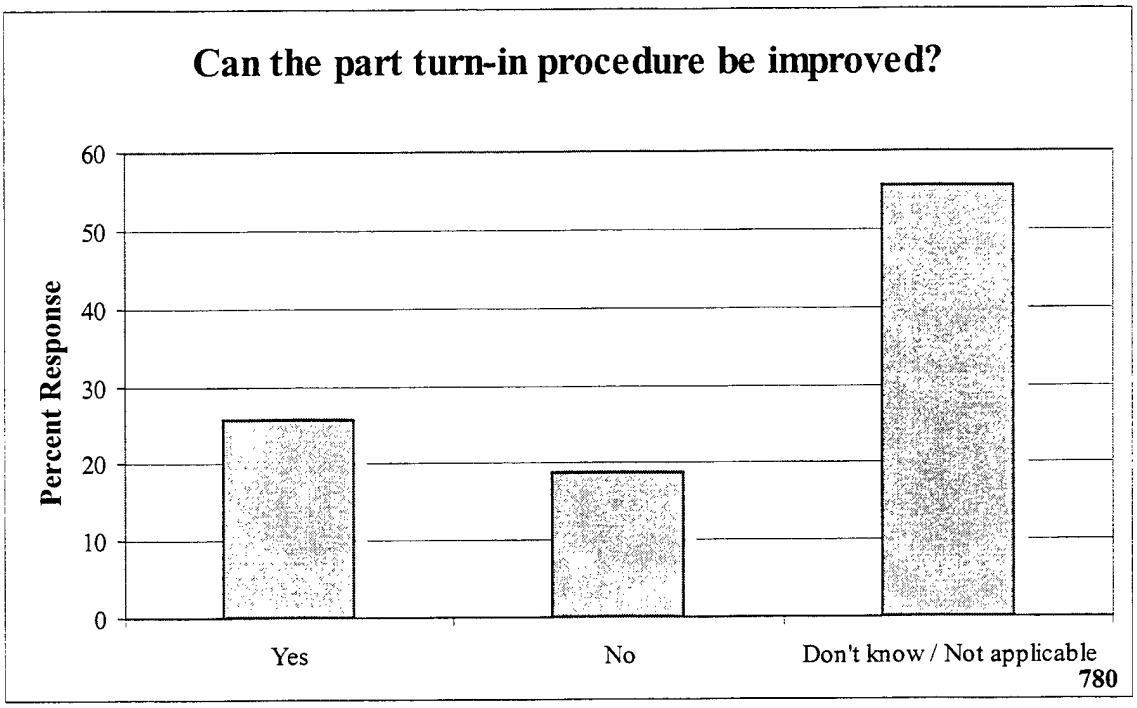


Figure A 11. 8



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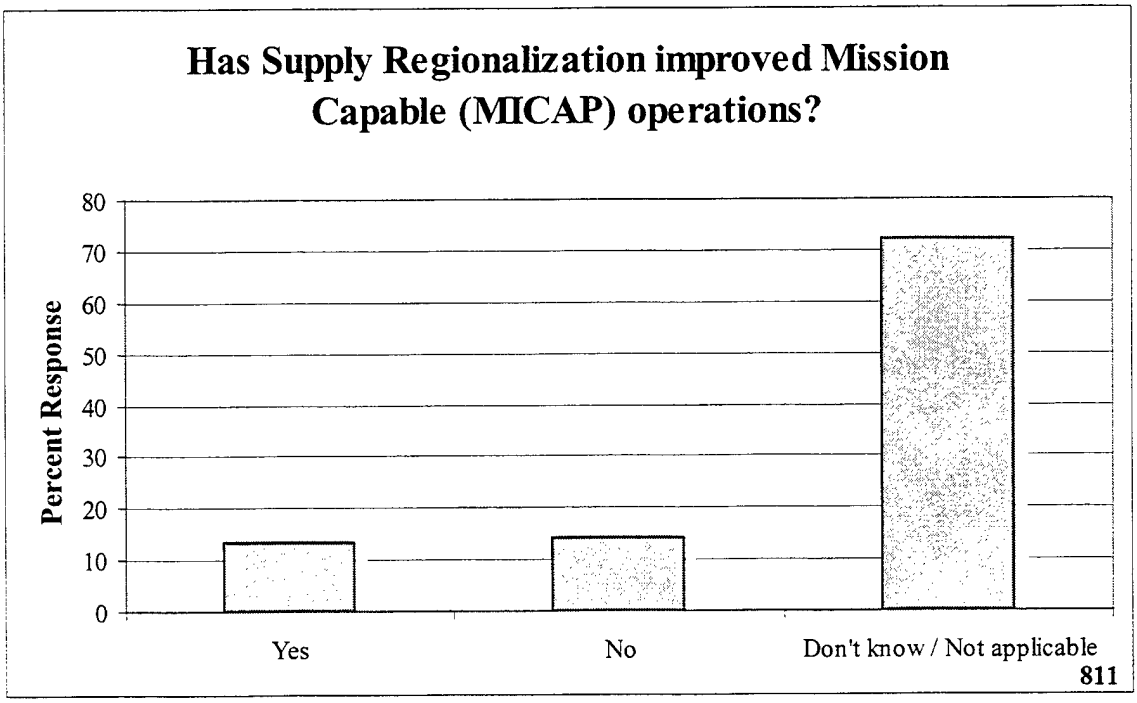


Figure A 11. 10

Supply Section

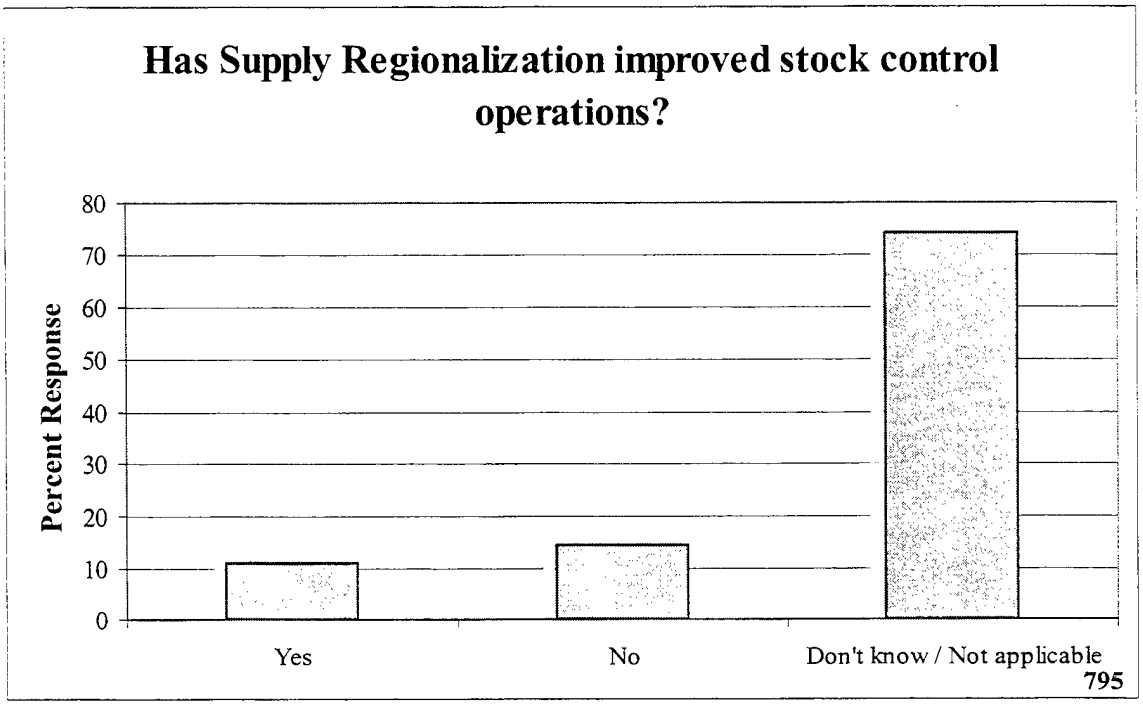


Figure A 11. 11

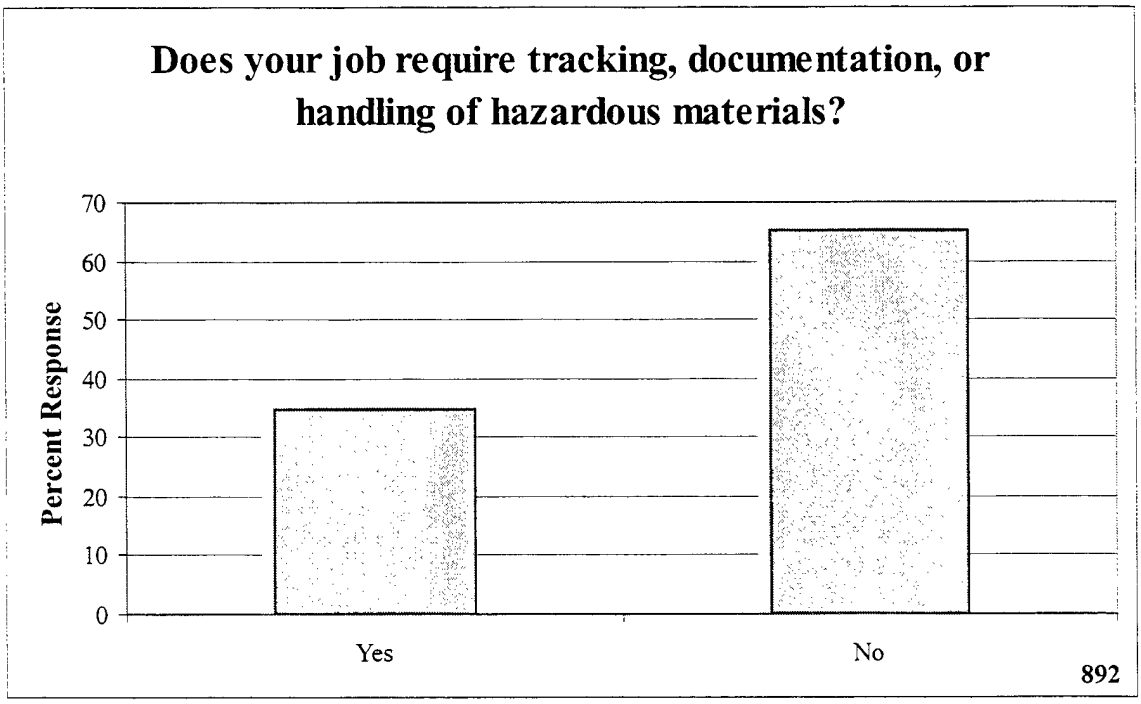


Figure A 11. 12

Computer Section

100 Participants Given Opportunity To Respond

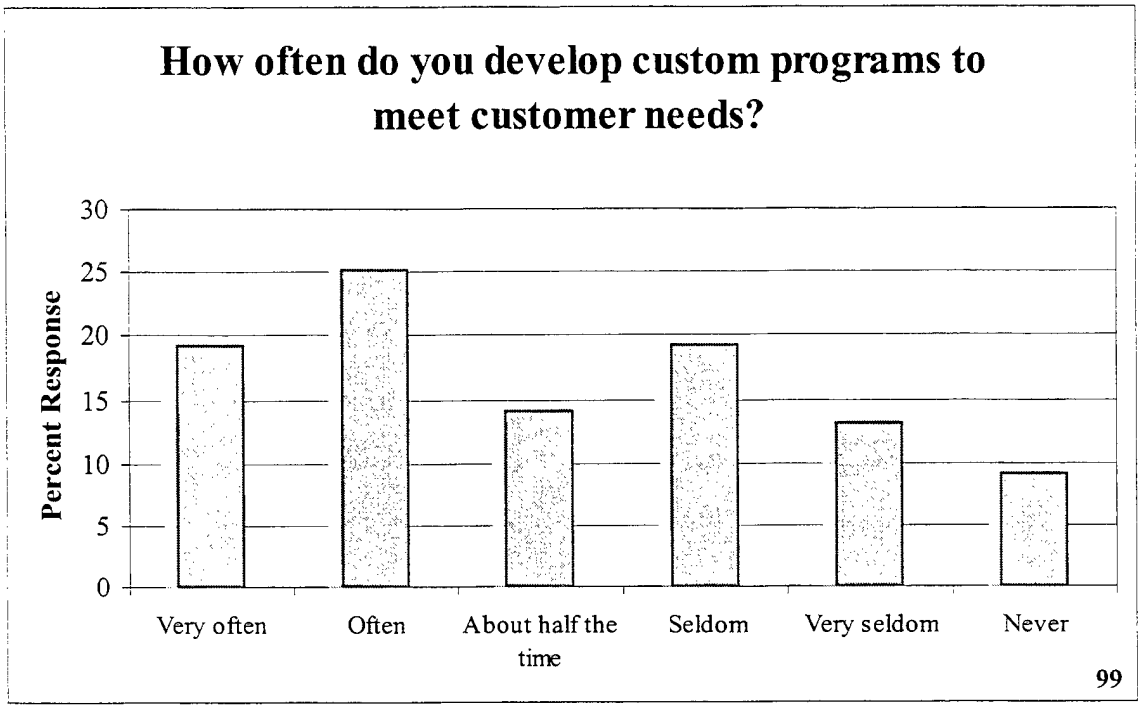


Figure A 12. 1

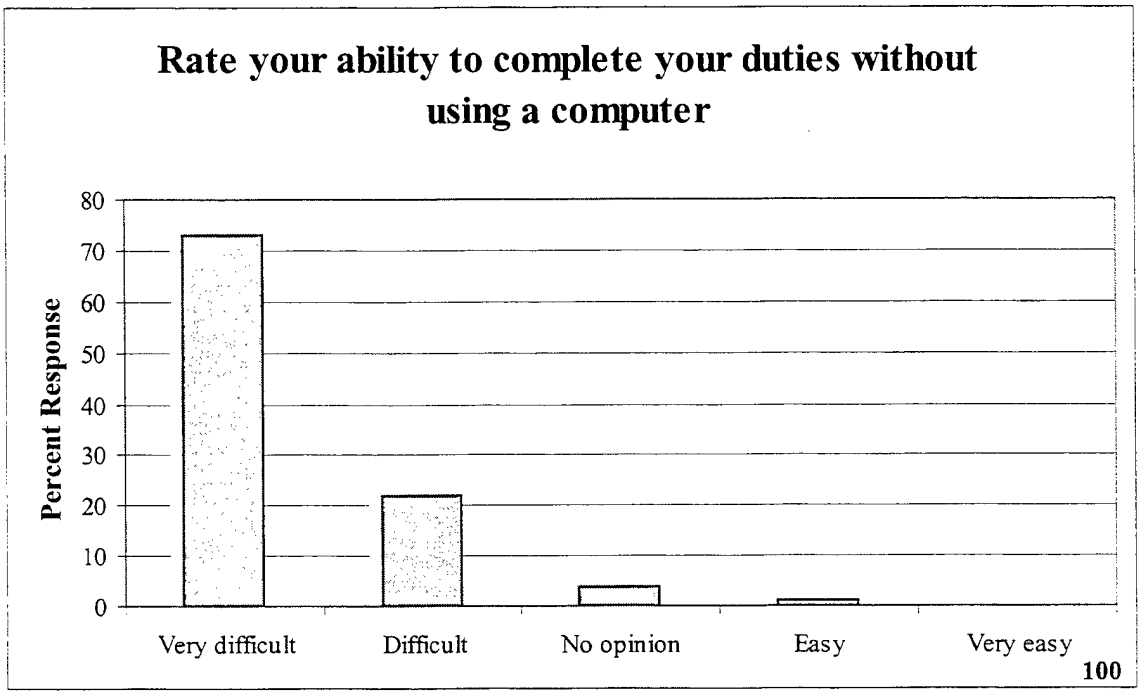


Figure A 12. 2

Computer Section

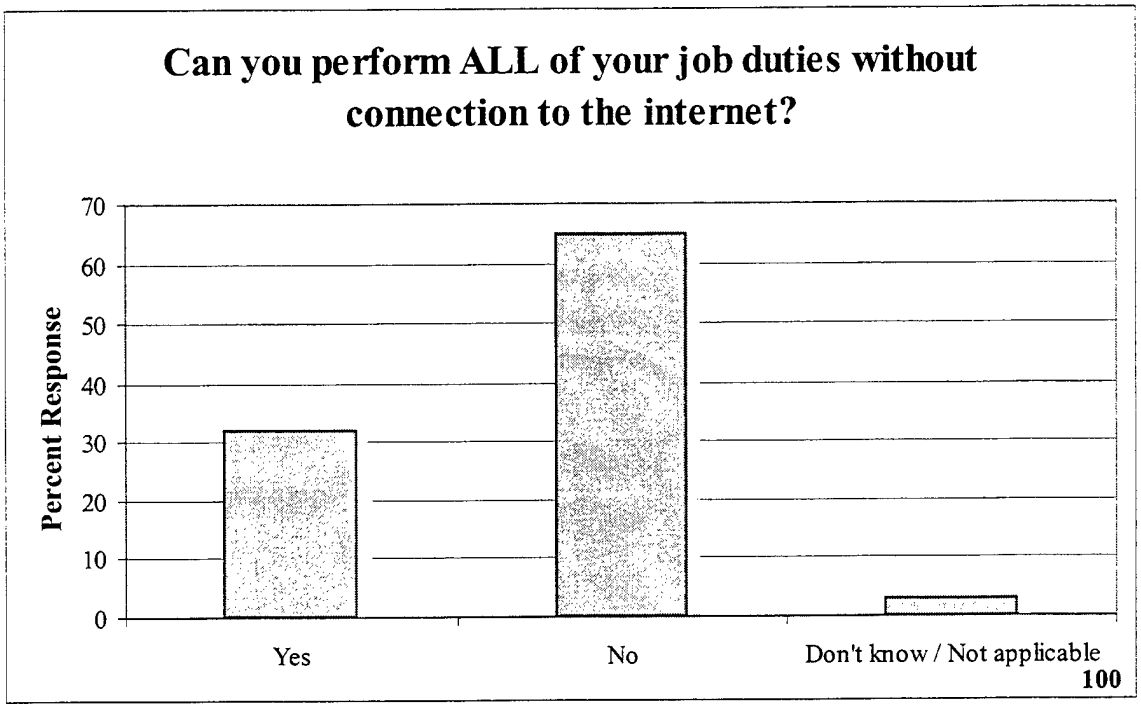


Figure A 12. 3

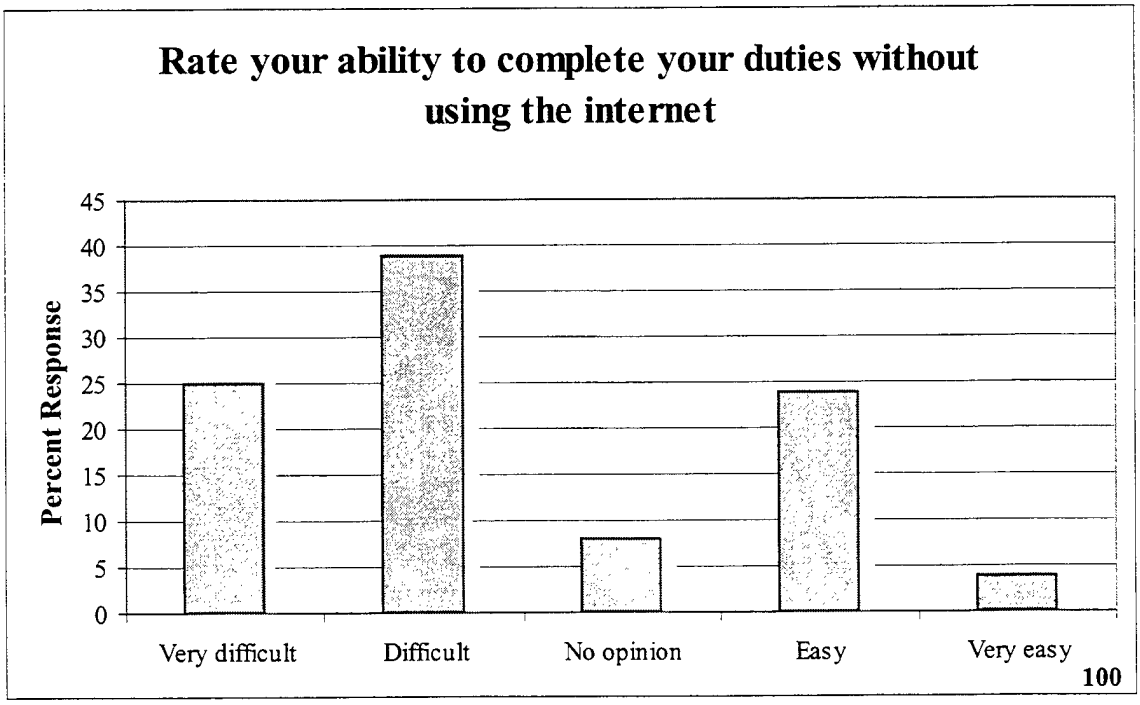


Figure A 12. 4

Computer Section

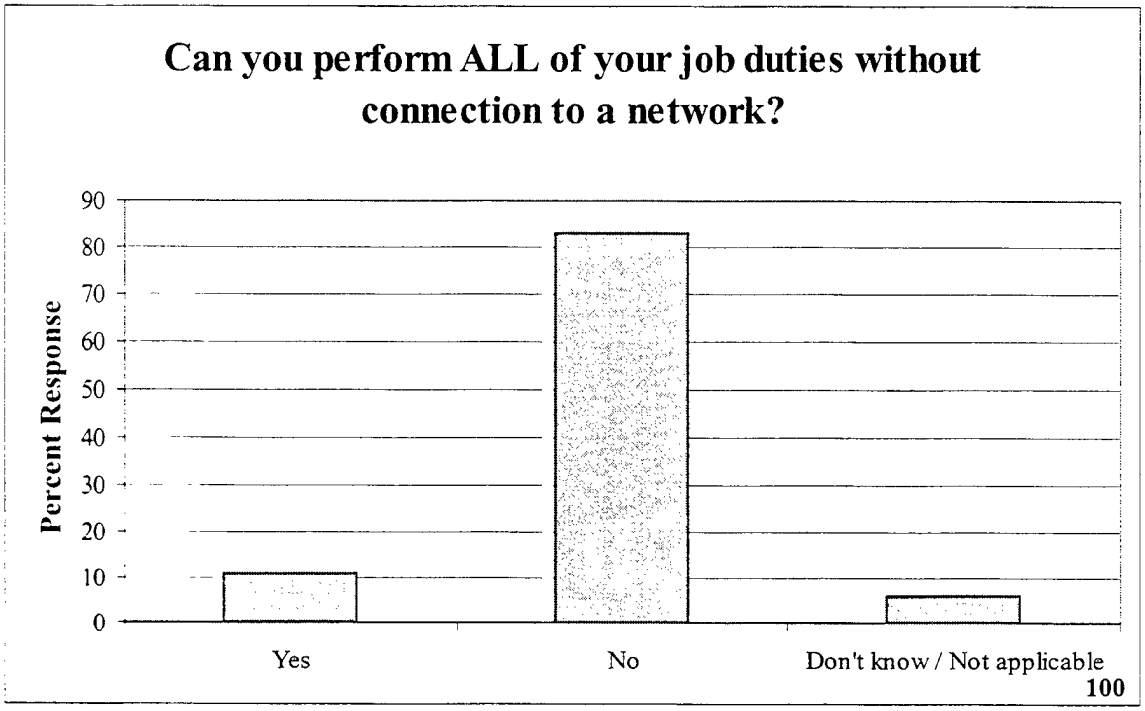


Figure A 12. 5

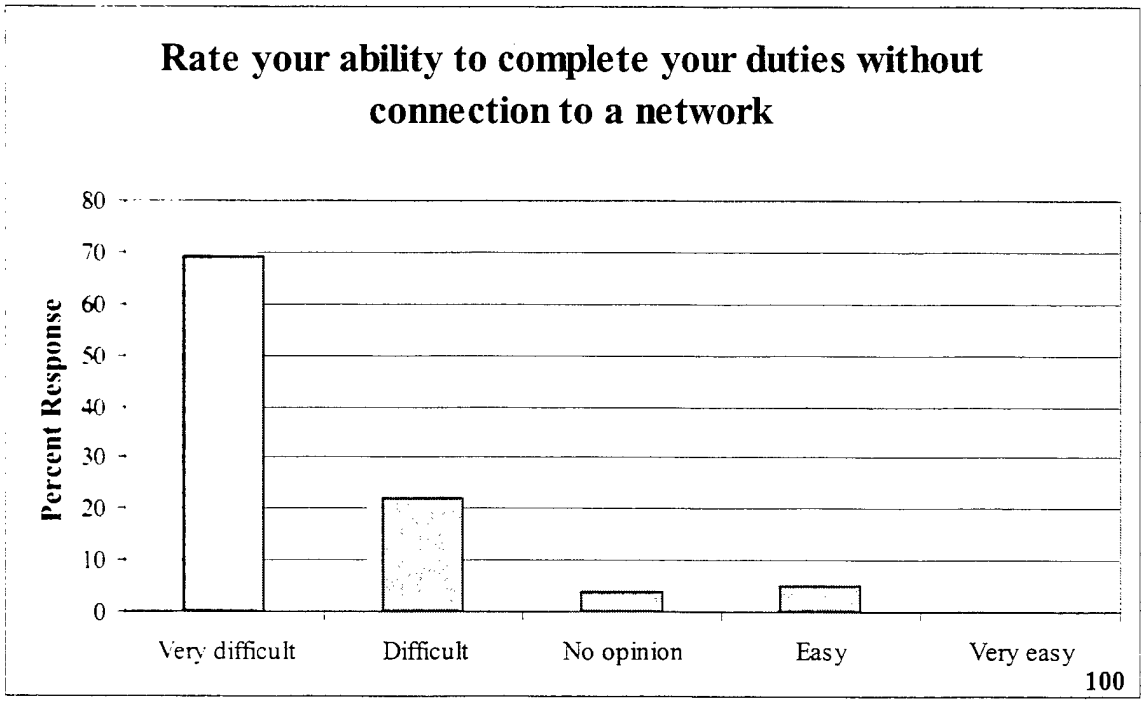


Figure A 12. 6

Computer Section

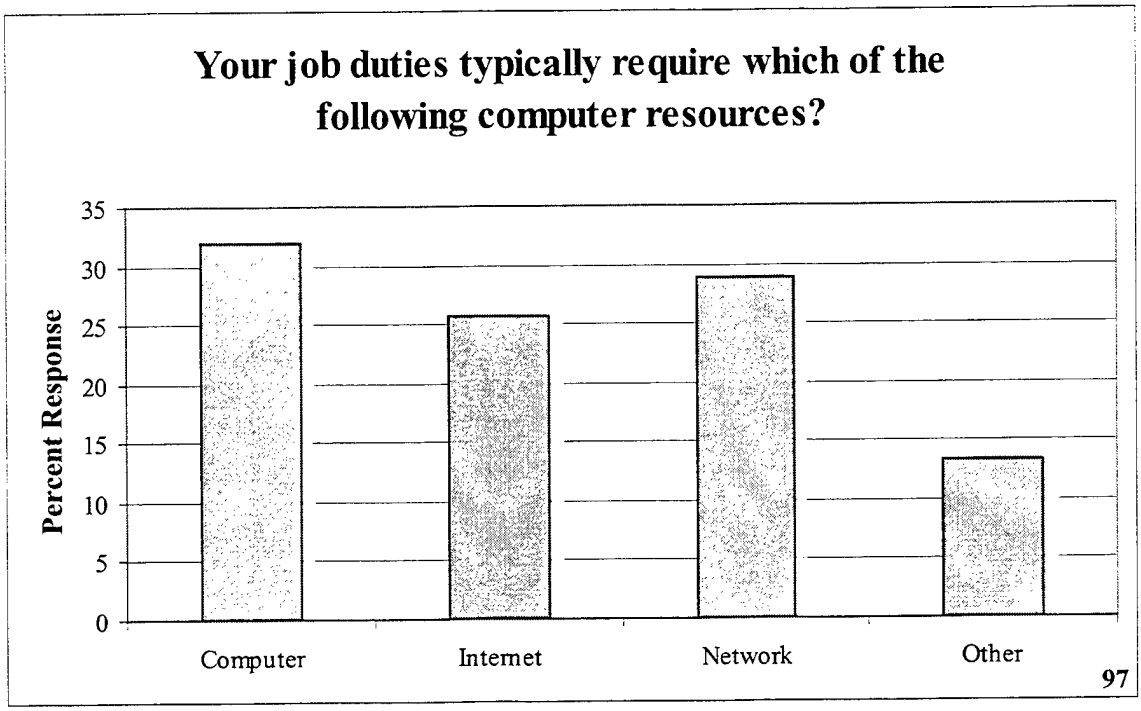
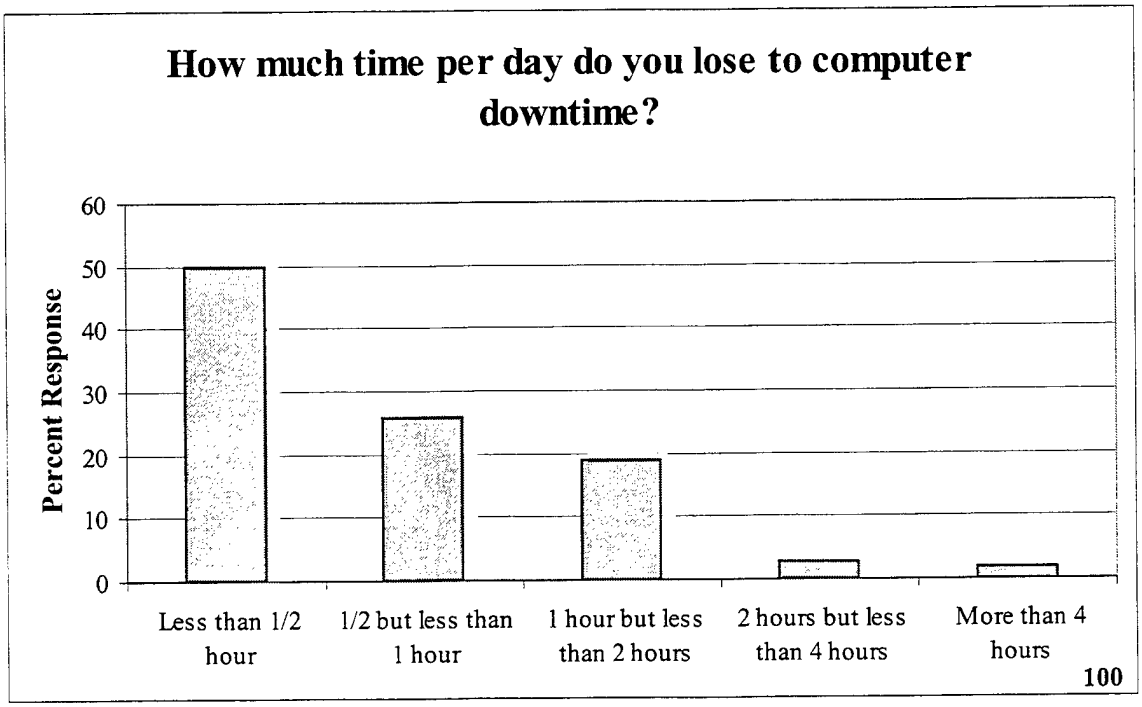


Figure A 12. 7



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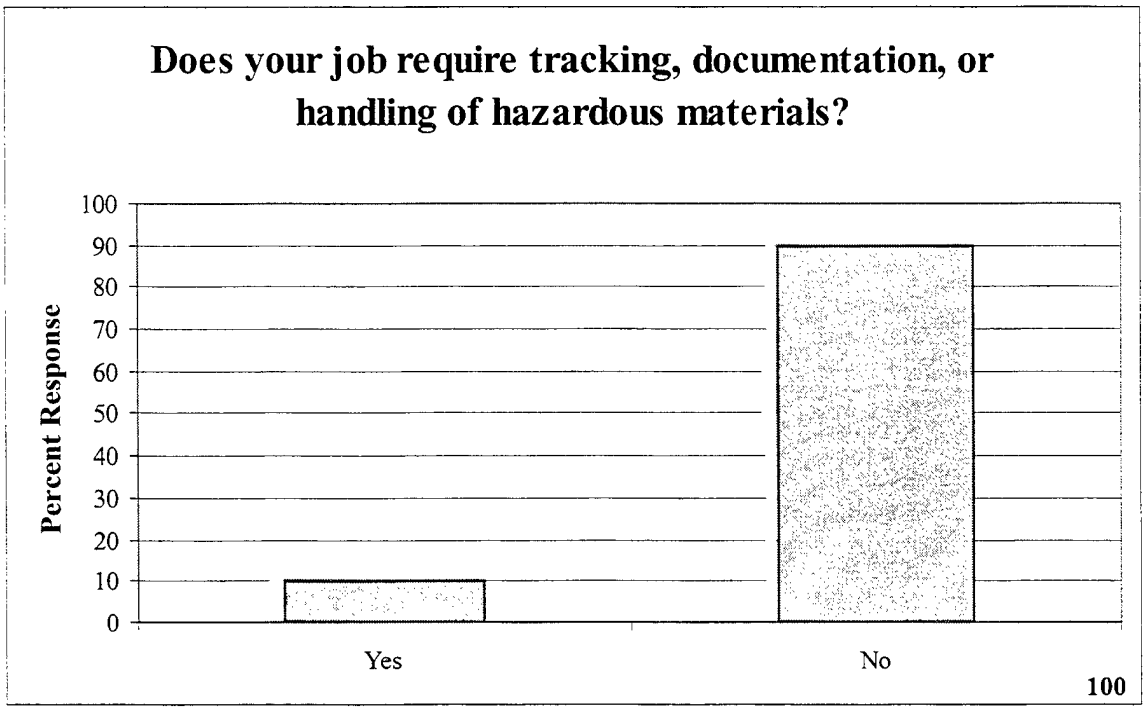

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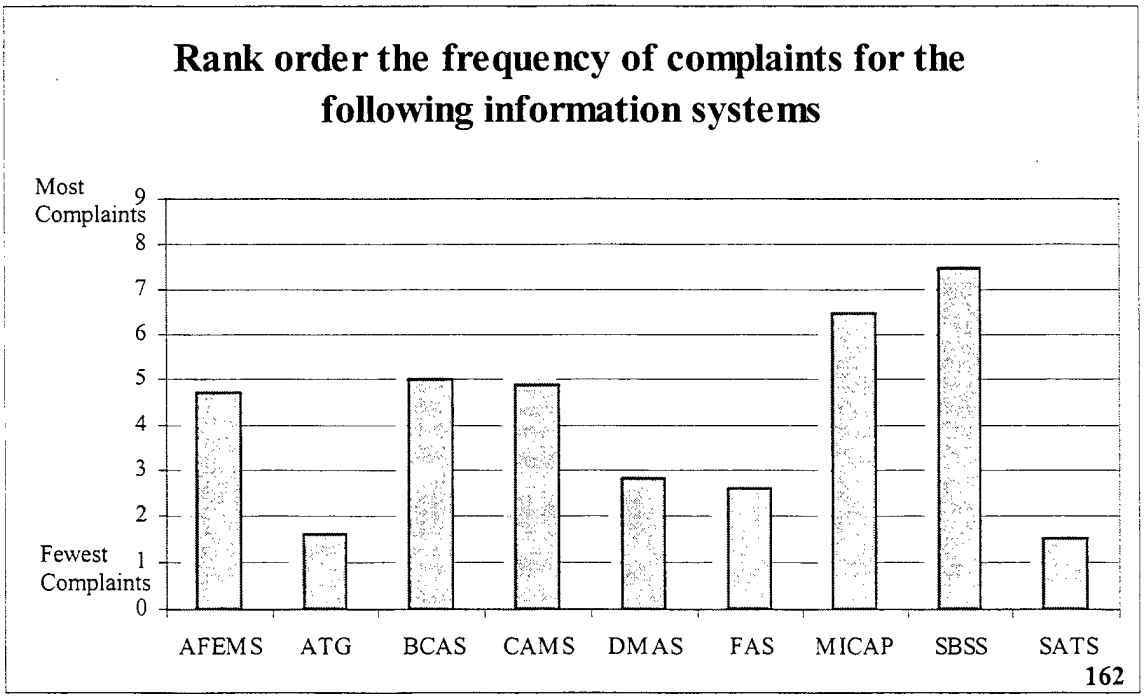

Figure A 12. 10

Computer Section

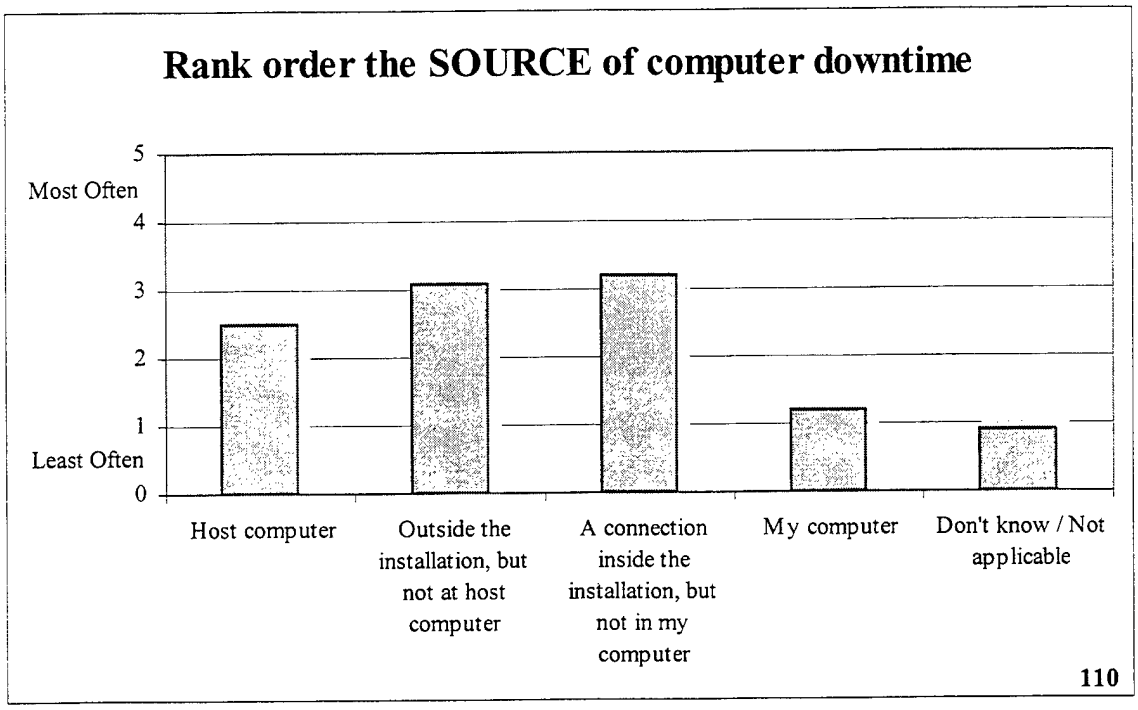

Figure A 12. 11

Hazmat Section

451 participants given opportunity to respond

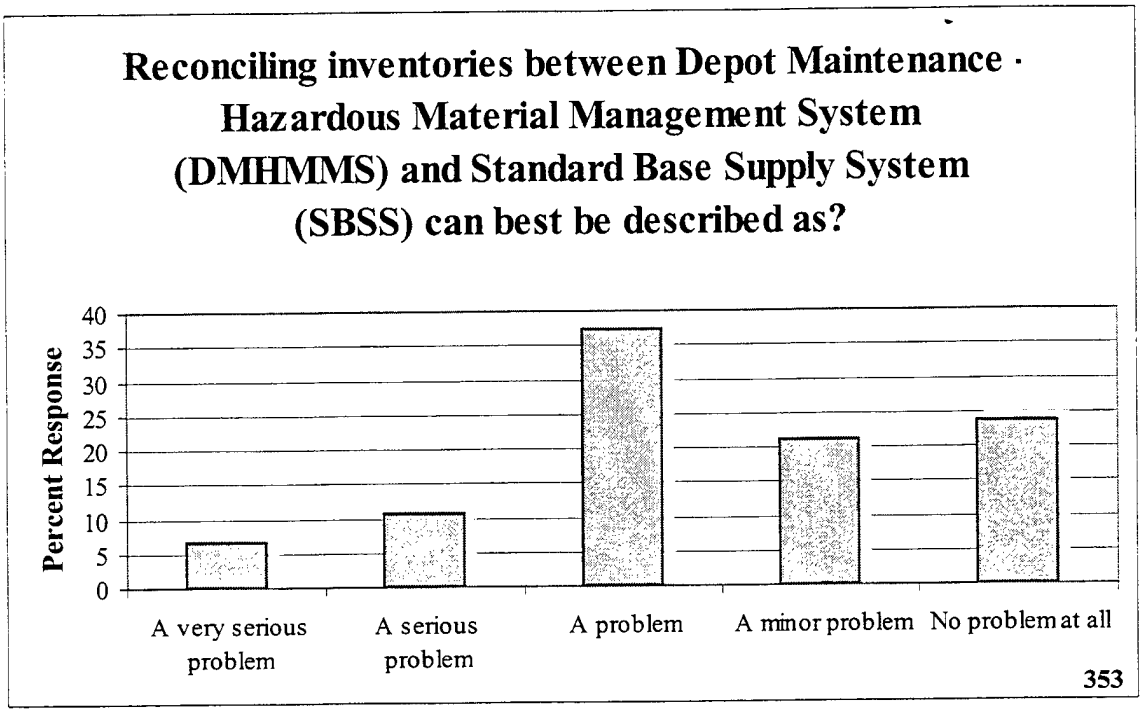
Reconciling inventories between Depot Maintenance · Hazardous Material Management System (DMHMMS) and Standard Base Supply System (SBSS) can best be described as?
Percent Response
40
35
30
25
20
15
10
5
0
A very serious problem
A serious problem
A problem
A minor problem
No problem at all
353

Figure A 13. 1

APPENDIX B – SURVEY SOFTWARE MINIMUM REQUIREMENTS

Survey Implementation

- Software has capability to be administered via Internet, Intranet, paper, or e-mail

Questionnaire Structure

- Both subjective and objective types of responses can be recorded for any given question
- Response scales must include: 5-7 point Likert, binary/multiple-choice, ordinal, and custom
- Branching structure (ideally, pull-down menus)
- Integrated help, featuring hypertext links to answers of commonly asked questions about survey content

Statistical Capabilities

- Content/Subjective (keyword) analysis
- Descriptive (means, standard deviation, mode, etc.) analysis
- Graphs/charts depiction
- Weight multiple independent variables

Survey Database

- Must be exportable into a standard format (e.g., Excel, Access, ASCII, etc.)
- Store subjective and objective responses
- The database can be expanded on an as needed basis
- Sorting and/or weighting capabilities (if not in statistics package)
- Demographic information be included in a database record

Other General Features

- GUI should project a professional and pleasing appearance
- Verify the software works as advertised (references?)
- System / software help
- Demo available
- Price less than $5,000

APPENDIX C – SOFTWARE EVALUATION MATRIX (REPLACE WITH EXCEL VERSION)

	Implementation					Questionnaire Design			Statistical Capabilities					Database						Other Features				Price	Comments	Rating
Survey Tool	Web	e-mail	Internet	Intranet	Paper	Sub/Ob or both	Response types	Hyperlink Branching	Subjective evaluation	Descriptive stat, corr, reg, etc	Graphic labels	Weight	Other important	Export (format)	Expandable	Sort/ Weight	Store sug data	# fields per record	Aesthetic GUI	System Help	Survey Help	Desc	$		
Survey Said www.bizrat.com/marketing_research/research.htm evaluated: Holly 5/15	X	?	X	X	X	both	LMC,O	?	?	external program (Survey Stats)	X	X		X	?	X	X	?	no	X	?	X	$1,295	Very rapid GUI. Price does not include Survey Stats	85
Creative Research Systems (Survey System) www.surveysystem.com evaluated: Holly 5/15	No	X	?	X	?	both	MC,O	?	option	option	X	?	sample size	X	X	?	?	?		?	?	X	$699	No web based support.	3
Training Technologies (Survey Tracker) www.traintech.com evaluated: Holly 5/15	Y	X	X	X	X	both	all 5 score	?	X	all 5 score	X	X	sample size	X	X	X	?	?	X	X	?	X	$10,000	Very expensive.	80
Decisive Technology (Decisive Survey 2.0) http://www.decisive.com/dy_mid_s/DecisiveLite.htm evaluated: Holly 5/15 (n=20-10000DK)	X	X	X	?	?	both	LMC,O	X	X	X	X	X		X	?	X	?	?	X	X	X	X	$799 100 responses	$1,999 for 1,200 responses. Looks fairly good	100
Pulse Train Technology (Stellwise MR) http://www.ws.pcec.com/stellwise.htm evaluated: Holly 5/15	X	?	X	X	?	both	LMC,O	?	?	external	?	?		X	?	?	?	?	?	?	?	X (bad)	?	Very sarcastic package	45
Research Systems (Market View) www.marketview.htm evaluated: Holly 5/15	X	?	X	X	X	both	LMC,O	?	?	very basic %	X	X		?	?	?	?	?	?	X	?	X (bad)	$250	Very limited	65
Survey Select www.surveyselect.com evaluated: Holly 5/15	X	X	X	X	X	both	LMC,O	?	?	X	X	X		X	?	X	?	?	?	X	?	X	$1,095	500 max questions	80
Sensus Software Inc. (WebCAT 2.5) www.sensus.com evaluated: Holly 5/14	X*	?	?	?	?	both	LMC,O	?	?	extensive	X	X		?	?	?	?	?	?	?	?	X	$2,000	* Only Java capable browser no HTML version Mac product only PC version	3
TAJ Systems (TAJ-SAP) www.tajsystems.com/contact.htm evaluated: Holly 5/14	NO GOOD Software analysis suite designed to analyze paper-based bubble surveys																								
World Research Inc www.survey.com evaluated: Holly 5/14	NO GOOD																								
Perseus (Survey Solutions) www.perseus.com evaluated: Holly 5/11	X	X	?	?	?	?	LMC,O,U	?	?	?	?	?		Access	?	X	?	?	?	X	?	?	$179	Everything is created by wizards. Their docs were down so couldn't get detail. Very limited	45
Pinpoint Software (EXAMPLE) users.aol.com/pinpointsurveys/surveytm.htm evaluated: Holly 5/11	NO GOOD																								
WEBPRO-survey (PRO-survey) www.pro-survey.com and www.netpro-survey.com/press.html evaluated: Holly 5/14	X	?	X	?	no	both	LMC	X	?	?	?	?		X	?	?	?	unlimited	?	X	?	X	$650	(Only offers one type of questions: MC, ID, secure Password, accesss)	65
SurveyWin PREVIEW, www.powerdi.com/scripts/article/PDC1510/PAGE/SPDC000.html evaluated: Holly 5/14	Just Review of SURVEYWin																								
Raosoft (SURVEYWin) www.raosoft.com evaluated: Holly 5/11	X	X	X	X	X	both	LMC,O	?	X	all inc score	X	X	sample size	X	X	X		unlimited	X	X	X	X	$149	Very, Very Impressed!	100
DDPE Computers & Performance (Questic) www.cope.nu/questic.htm evaluated: Holly 5/14	X	?	X	X	?	both	LMC	?	?	?	?	X	?	X	?	?	?	?	?	?	X	X	?	Updates questions based on previous questions. (DEFERED)	45
TextSmart 1.0 PREVIEW, search, zone1.compuserve.com/scripts/docs/SITE/SITE0366.htm evaluated: Holly 5/14	Just review of TextSmart																								
TextSmart www.spss.com/software/textsmart evaluated: Holly 5/14	Answers text for open-ended questions																								
Attitude Technologies (Assessteck) http://www.wizdom.com/assessteck.htm evaluated: Holly 5/15	?	?	?	?	?	?	LMC,O	?	?	?	?	?		?	?	?	?	?	?	X	?	X (bad)	?	No information on web, size or in demo. Custom package that they would have to build	?
Power Knowledge Software (PowerTab) www.powerknowledge.com/home.htm evaluated: 10 Sept 98 (CC)	X				X																	Yes	$199	Too simplistic. Requires a Mac platform	45
NobleQuest, Inc www.noblequest.com/homepage.asp evaluated: 10 Sept 98 (CC)	X		MEN	X		X	X	X		NA?				?	?	?	X	?	Yes, can Custom	Yes text help		Examples	?	JavaScript available. Inpenent on vocb.	45
ZJ Software, Inc (WebSurveyor) www.websurveyor.com evaluated: 10 Sept 98	X	X	X			?		?		X	X			X					Windows	?		X	< $30	Report Gs: mail test file. E-mail notifications to groups. Appears intuitive, but slow not as flexible enough	45
Decision Architects (WebExSight) www.decisionarc.com/introduction.htm evaluated: 10 Sept 98	?									X	X											Call	?	Participants loading web page. Web-based survey?	?
WebSurv (AndersonBell) http://www.andersonbell.com/corporate.asp?hc_5 evaluated: Holly 5/11	X					both	LMC,O	X	?	?	?	?	?	?	?	?	?	?	?				$5,000		85

*Denotes likert, (L), binary/multiple choice (MC), Ordinal (O), User-defined (U), TBD

Rating Criteria

No Web capability = automatic 0

Yes = 0

Web capability = 20

Sub/Ob, & 3 response types = 20

Built-in analysis capability = 20

Good GUI = 20

Price < $5,000 = 20

APPENDIX D – SURVEY SOFTWARE SCORE SHEET

Survey Software Final Evaluation

Date: _____ Evaluator: _____
Software Tool: _____
Overall rating compared to other vendors: 1 2 3 4
(1= best - 4= worst)

Usability - developer

- How good is the help feature?
- Question development: WYSIWIG?
- Question development: Can question format be modified (font, size, style, location, other)?
- Question development: Can response format be modified (e.g., Multiple choice responses oriented horizontally instead of vertically)?
- Question development: What is the basic process (one screen, several screens, or actions)?
- Question development: Skip logic or branching. Intuitive to use?
- Survey design: Branching directly to a "topic" prior to questions and in Intro. page (e.g., four topics of logistics)?
- Survey design: Are questions per HTML page or scroll within window or both (Note: scrolling with several "major branches" and many questions is not preferred).

Usability - surveyee

- Option to review and possibly change the response for previously answered questions through use of a back button.
- Help style: Pull-down, hyperlink, right click, etc.
- Help content: Developer installed text specific to question topic versus Survey s/w help
- Feedback: As to having responded to a question.
- Feedback: Error checking, prevention, on send (tell if question incomplete, allow once to continue, else send).
- Feedback: Is user forced to respond to all questions (or optional).
- Option to review questionnaire before submission.
- If questions are presented in a scrolling window, branching allows the surveyee to respond only to questions of interest. Does the surveyee become introduced to unnecessary or irrelevant information when scrolling back to the top of the page?
- GUI: Does each "screen" provide an exit, top, bottom (others?)
- GUI: Will user ever need to scroll horizontally, i.e., do pages fit on "smallest" user displays
- GUI: Appearance (aesthetics). What did you prefer (3D effects, etc.)? Not as big an issue if we can over/underlay text/graphics, and reformat what is provided.

Response Database

- Sort capability (or via statistics)
- Weighting capability (or via statistics)
- What is the basic format? Was the database generated by a software package? If so, what package?
- If the data is gathered via various sources (web, e-mail, and paper), can all the data be incorporated into one database?
- Can one database be used for several different surveys (i.e., be appended to)?
- Can data from two surveys be appended?
- Anything special with the method of updating the database?

Response Format/Style

- Response formats include (select from list of some common formats):

Essay	Multiple choice	Binary choice	Paired comparisons
Rank	Numeric entry	Instruction Box	Semantic scale
Custom	Comment plus	Other_____	

- Response styles include (select from list):

Radio button	Single Check	Multiple Check	Open-ended box
Pull-down	Scroll box	Number	Other_____

Statistical Features

- Sort capability (or via statistics)
- Weighting capability (or via statistics)
- Major statistical analyses may include any or all listed below (check all that apply)

Descriptive	Cross-tabulation	Open-ended	Error
ANOVA	Regression	Frequency	Other_____

Miscellaneous

- Does the software produce sluggish performance on moderate machines (graphics, processing, etc.?)
- Does survey administration require specific *hardware* platforms (minimum requirements)?
- Does survey administration require specific *software* platforms (minimum requirements)?
- Does survey software require specific platforms (minimum requirements if unusual, e.g., Pentium 300).
- Security: How are the responses collected?
- Security: Are the results encoded for transmission?
- Can the results be encoded for transmission?
- Security: What are the internal features that insure security?
- Security: What is the format for the survey file hosted on the server?
- Administration: Verify implementation on 1) Web, 2) e-mail, 3) paper, 4) Intranet, 5) disk.
- Users: What is maximum number per survey?
- Questions: What is maximum number per survey?
- Responses: What is maximum number per question?
- Questions: What is limit per survey?
- Can the vendor provide current references?

APPENDIX E – INTERVIEW SCRIPT

To:

From:

CC:

Date:

Re: Logistics Survey

SUGGESTED INTERVIEW SCRIPT

Use the following outline in the initial interview to trigger responses from the group. If there is insufficient room to write all responses in the provided space, use blank paper and note the sub-paragraph number so we can collate the data later.

1. INFORMATION SYSTEMS

1.1 What are your issues with Readiness Based Leveling (RBL)?

1.2 What are your experiences with EXPRESS (The depot prioritizing scheme)?

1.3 SBSS is being modernized and replaced by ILS-S. What needs to be done?

1.4 In-Transit Visibility is a problem for everyone in Logistics. What are the areas that need fixing in your opinion?

1.5 RSP size and DMAS are key to the "Lean" of Lean Logistics. How do you see these areas being improved?

1.6 Much work still needs to be done in order to improve Order and Ship Times (O&ST) for reparable items. What suggested areas should the Lab could look at?

1.7 One way to cut down on deployed personnel is the concept of the Combat Supply Support (CSS) in a rear area, which does most of the support and "reach-back" for the few deployed supply technicians. What are the issues with this concept that still need research?

2. PROCESSES

2.1 Consolidation of some supply and transportation functions began recently in ACC. What areas do you see for further consolidation or streamlining? Think outside the box. This is future stuff. Don't worry about job preservation.

2.2 Are there any process issues in RBL that we didn't cover in the previous topic?

2.3 As you know, Contracting of Supply and similar functions is a reality. What issues in this area come to mind? What about combat area support? Training? Response to military crises?

2.4 Another form of the contracting issue is the possibility of direct issue of parts from contractors/vendors to users versus the traditional issue from depot stock. How does this play. What areas need to be looked at here?

3. PACKING AND SHIPPING

3.1 With the reorganization process started at Shaw, came a revolution in the shipping of small parts. For as long as history, we have used strict rules for packaging reparables. Changing to express shipping packages and more universal packages is a major change. What is the next step?

3.2 Pallet building for mobility is an art as well as a science. It is very time consuming and has lots of rules. Yet, commercial shippers seem to have simpler processes. Any ideas where the Air Force could research and gain an advantage? What about ISO containers, etc.?

We hope these questions will trigger some thoughtful responses. Try to write as much explanatory detail as possible so we don't have to spend a lot of time transcribing the audiotapes.

ISSUES RAISED AT WPAFB SUPPLY INTERVIEWS

- Access and password problems
- Automated identification equipment (AIT)
- BCAS interface for supply – many must use old style terminals
- Budget?
- Central control and service of mainframe systems
- Changes to one system must interface with other effected systems. Who is doing this?
- Computer downtime
- Contract issues?
- CONTRACTED OUTSOURCING IS AN ISSUE FOR THE AIR FORCE
- Cross-training is beneficial
- Delinquent documents
- Desktop ordering
- DIFM – DLR emphasis on getting reparable parts back into supply system seems to have diminished. What is status of DLR program?
- DMHMMS (HAZMAT management system) does not talk to SBSS
- Equipment management systems which work with barcodes. Equipment is in hand, but not used. Caused by either unreliable or untrained.

- Hoarding?
- IMPAC card
- Incentives
- In-Transit visibility is now mostly verbal
- Inventory procedures
- Manning and compensation issues
- Manning levels on new contracts
- Many folks have to handle
- Materiel handling equipment
- Mobility
- Motivation to take surveys
- MSDS
- Oversight?
- Paperwork lost in transit
- Reject listings
- Scanners – property coming in with little information, especially in regard to HAZMAT
- Several parts to form
- Systems that don't talk to each other, requiring manual updates. Never in synch.
- Telephone coords
- Training – Initial, Hands on training in tech schools
- Trust not given
- Turn-over procedures (Friction between outgoing and incoming)
- Types of training – "varies by person"
- Wage levels
- Warehouse and HazMat people will be building pallets
- What is the future of the tech schools as we go contract/outsource?
- When will they become augmentees to deploy?

APPENDIX F – SURVEY TEXT

Logistics Survey

The Air Force Research Laboratories Human Effectiveness Deployment and Sustainment (AFRL/HES) Division is conducting a Logistics Survey that addresses supply/fuels personnel Air Force wide. The goal of the survey is to identify new research areas in which AFRL/HES can develop technology, equipment, software, or otherwise, that can improve the supply community's ability to perform in war and peacetime. By answering the survey, you will directly contribute to the possible future improvement of supply policies and procedures and ultimately the improvement of support to the future warfighter.

AFRL/HES time horizon for research and development is five years from concept to fielding. Thus, you are encouraged to think "outside-the-box" when completing the survey. The supply community is undergoing drastic changes, regionalization of supply functions (Mission Capable, Stock Control, Funds Management), supply asset tracking system (SATS), and the merging of transportation and supply functions. You are encouraged to look beyond these innovations and identify areas or ideas that you believe will create improvement opportunities within supply. Additionally, AFRL/HES is asking you to help identify issues that need to be refined, studied, fixed, changed, improved, or eliminated to provide optimal supply support to the Air Expeditionary Force concept.

Instructions

This survey will take approximately 15-20 minutes to complete.

A partially completed survey CANNOT be saved, so please allow sufficient time.

If you experience, "JavaScript errors," please make sure your Internet browser is Java enabled. If you continue to experience JavaScript errors please disregard, although not normal, this does not harm the data so PLEASE continue.

The survey is separated into sections. Each section ends with "Previous" and "Next" buttons.

Some questions MUST be answered in order to continue the survey.

Several questions permit more than one response. Select all that apply.

Detailed Instructions and Help are available at anytime via hyperlinks located in the upper right-hand corner of each section.

When you have completed the survey, you will be directed to the AFRL/HES home page where you can look at future, current, and past research efforts.

Demographics

Name (optional)
->

E-mail address (optional)
->

Phone number (optional)
[ ]

Current Air Force Specialty Code (AFSC, e.g. 2S051)
[ ]

Current Duty Title
[ ]

Years of experience in the Supply career field?
[ ] Click here to see response options
[ ] Less than 1 year
[ ] 1 - 5 years
[ ] 6 - 10 years
[ ] 11- 15 years
[ ] More than 15 years

Please enter your type of employment (RESPONSE REQUIRED!)
[ ] Contractor
[ ] Department of Defense Civilian employee
[ ] Military

Contractor

Please enter your employment status.
[ ] Click here to see response options
[ ] Full-time
[ ] Part-time

Have you ever worked as a Department of Defense (DoD) civilian or military employee?
[ ] Click here to see response options
[ ] Yes
[ ] No

Are you employed in the same job or position you had as a DoD employee (civilian or military)?
[ ] Click here to see response options
[ ] Yes
[ ] No
[ ] Not applicable

How does your job differ as a contractor (check all that apply)?
[ ] Loss of access to information required to perform my job
[ ] Less respect from non-contractor co-workers
[ ] Less help from civilian/military co-workers
[ ] Lower-quality support equipment
[ ] Other (select to enter a text response)

As a contractor, have you lost access to information necessary to perform your job that you had access to as a DoD civilian or military employee?
[ ] Click here to see response options
[ ] Yes
[ ] No

What types of information are, as a contractor, difficult to access (check all that apply)?
[ ] Standard Base Supply System (SBSS)
[ ] Federal Logistics Data (FEDLOG)
[ ] Automated Stock Number User Directory (ASNUD)
[ ] Windows Mission Capable Asset Sourcing System (WinMass)
[ ] Other (select to enter a response)
[ ] Not applicable

When converting to a contractor-operated unit from a DoD civilian/military-operated unit, is a government-sponsored conversion/transition necessary?
[ ] Click here to see response options
[ ] Yes
[ ] No

Why is the civilian-to-contractor conversion/transition period necessary (check all that apply)?
[ ] To explain all aspects of the task
[ ] To explain small details of the task
[ ] To explain "work-arounds" (i.e. deviation from a method or procedure's formal instructions which results in increased operational efficiency or effectiveness).
[ ] To complete open issues
[ ] Other (select to enter a response)

Were you able to perform your normal job duties during the conversion/transition period?
[ ] Click here to see response options
[ ] Yes
[ ] No

As a contractor, how much training was provided for your present job?
[ ] Click here to see response options
[ ] None
[ ] about 1 day
[ ] about 1 week
[ ] about 1 month
[ ] More than 1 month

Was the training sufficient?
[ ] Click here to see response options
[ ] Yes
[ ] No

Do you have any recommendations for improving supply functions at base level, currently or in the future?
->

Does your job require travel in support of operations, contingencies, or exercises? (RESPONSE REQUIRED!)
[ ] Yes
[ ] No

Military

Please enter your current military rank
[ ] E1 - E3
[ ] E4 - E6
[ ] E7 and above
[ ] O1 - O3
[ ] O4 - O6
[ ] O7 and above

Does your job require deployment in support of operations, contingencies, or exercises? (RESPONSE REQUIRED!)
[ ] Yes
[ ] No

Department of Defense (DoD) Civilian Employee

Please enter your current civilian grade
[ ] WG-5 - WG-7
[ ] WG-9 - WG-12
[ ] WG-13 - WG-14
[ ] Over WG-14
[ ] GS-5 - GS-7
[ ] GS-9 - GS-12
[ ] GS-13 - GS-14
[ ] Over GS-14

Does your job require deployment in support of operations, contingencies, or exercises? (RESPONSE REQUIRED!)
[ ] Yes
[ ] No

Deployment

Have you deployed in support of logistics operations within the last 12 months?
[ ] Click here to see response options
[ ] Yes
[ ] No

The last time you were deployed, did you receive any job-related (refresher or otherwise) training prior to your last deployment?
[ ] Click here to see response options
[ ] Yes
[ ] No

Can you perform ALL of your job duties before computers and the internet are setup in a deployed location?
[ ] Click here to see response options
[ ] Yes
[ ] No

Once the computer equipment is configured at a deployed location, can you complete your job duties?
[ ] Click here to see response options
[ ] Yes
[ ] No

With 1 being the biggest concern and 5 being the smallest concern, please rank order your concerns with information systems at deployed locations.
[ ] Interconnectivity between information systems
[ ] Having to input the same information to multiple systems
[ ] Receiving the same information (output) from multiple systems
[ ] Connectivity from the deployed site to other locations
[ ] Other

What improvements could be made in equipment used during deployments (check all that apply)?
[ ] Faster processing computers
[ ] Quicker equipment setup
[ ] Portable computers (i.e., notebook computers)
[ ] Other (select to enter a response)
[ ] None

How does equipment you have used in a deployed environment compare to equipment you use at your home station?
[ ] Click here to see response options
[ ] Much better equipment is used in deployments
[ ] Better
[ ] Same
[ ] Worse
[ ] Much worse

What recommendations do you suggest for improving supply support at the deployed location?
->

Regarding the Air Expeditionary Force (AEF), which responses are a potential problem to the future of AEF (check all that apply)?

[ ] Too few resources (personnel) to meet deployment objectives
[ ] Too few resources (material) to support deployment objectives
[ ] Lack of automated tools (computers, LAN, AIT, etc.) when deployed
[ ] Continued support for rotational sites over and above AEF tasking
[ ] Other (select to enter a response)

Climate for Deployment

How frequently do you deploy?

[ ] Click here to see response options
[ ] Once every three months
[ ] Once every six months
[ ] Once every year
[ ] Once every two years
[ ] Less than once every two years

How long are you deployed annually in support of operations, contingencies, or exercises?

[ ] Click here to see response options
[ ] Fewer than 8 days
[ ] 8 - 30 days
[ ] 31 - 90 days
[ ] 91 - 120 days
[ ] 121 - 179 days
[ ] 180 days or more

How many days in the past year were you on temporary duty (TDY) for training or other travel NOT related to operations, contingencies, or exercises?

[ ] Click here to see response options
[ ] Fewer than 8 days
[ ] 8 - 30 days
[ ] 31 - 90 days
[ ] 91 - 120 days
[ ] 121 - 179 days
[ ] 180 days or more

Training

Did you attend formal training (tech school, etc.) for duties associated with your current job?

[ ] Click here to see response options
[ ] Yes
[ ] No

How did you receive your job-related training? (check all that apply)
[ ] A class off-site
[ ] A class on-site
[ ] On-the-job (OJT)
[ ] Other (select to enter a response)

How effective was training?
[ ] Click here to see response options
[ ] Very effective
[ ] Effective
[ ] No opinion
[ ] Ineffective
[ ] Very ineffective

Can you perform your job duties using a manual method (post-post), that is, without a computer?
[ ] Click here to see response options
[ ] Yes
[ ] No
[ ] Don't know / Not applicable

Have you ever been trained to perform your job using manual methods?
[ ] Click here to see response options
[ ] Yes
[ ] No

Why do you use manual methods to perform your job (check all that apply)?
[ ] Easier
[ ] Computer system crashed
[ ] Computer system is not operational (for example, during the first week of an operations deployment)
[ ] Other (select to enter a response)

Do you remember how to perform your job using manual methods?
[ ] Click here to see response options
[ ] Yes
[ ] No

Main

For the following questions, a "work-around" is defined as a method or procedure that deviates from formal instructions which results in increased operational efficiency or effectiveness.

Do you use any "work-arounds" to complete your daily tasks?
[ ] Click here to see response options
[ ] Yes
[ ] No

How often do you use "work-arounds?"
[ ] Click here to see response options
[ ] Very Often
[ ] Often
[ ] Half the time
[ ] Sometimes
[ ] Rarely

How much time per day do the "work-arounds" save you in completing a daily task(s)?
[ ] Click here to see response options
[ ] Less than an hour per day
[ ] 1-2 hours
[ ] 3-4 hours
[ ] More than 4 hours

Why do you use "work-arounds" (check all that apply)?
[ ] System is outdated
[ ] System is sluggish
[ ] System is difficult to use
[ ] Other (select to enter a response)

Do you have any recommendations for improving building Mobility Readiness Spares Package (MRSP)?
[ ] Click here to see response options
[ ] Yes
[ ] No

For the next question, the 'Parts Kit' includes: Mobility Readiness Spares Package (MRSP), Mission Support Kit (MSK), or Time Change Technical Order (TCTO).

Do you have any recommendations for improving the parts kit building process?
[ ] Click here to see response options
[ ] Yes
[ ] No
[ ] Don't know / Not applicable

Information Systems

Select the automated information systems you use in your present job (check all that apply).
[ ] Air Force Equipment Management System (AFEMS)
[ ] Automatic Tank Gauging (ATG)
[ ] Base Contracting Administration System (BCAS)
[ ] Consolidation Aircraft Maintenance System (CAMS)
[ ] Automated Maintenance System (GO81)
[ ] Dynametrics Microcomputer Analysis System (DMAS)
[ ] Federal Logistics Data (FEDLOG)
[ ] Fuels Automated System (FAS)
[ ] Mission Capable Asset Sourcing System (MICAP)

[ ] Standard Base Supply System (SBSS)
[ ] Supply Asset Tracking System (SATS)
[ ] Air Force Material Command Stock Control and Distribution System (D035)
[ ] Air Force Master Item Identification Data Base (D043)
[ ] Other (select to enter a response)
[ ] Don't know / Not applicable

Do you deploy with any of these systems?
[ ] Click here to see response options
[ ] Yes
[ ] No

With 1 being the biggest concern and 5 being the smallest concern, please rank order the concerns you have with information systems at your base.
[ ] Interface between information systems
[ ] Having to input the same information to multiple systems
[ ] Receiving the same information (output) from multiple systems
[ ] Inconsistent user interfaces
[ ] Other

Do you have any recommendations for improving the Supply Asset Tracking System (SATS) system?
->

Please enter your specialization. (RESPONSE REQUIRED!)
[ ] Fuels
[ ] Supply
[ ] Computers

Fuels

Have you ever used Fuels Mobility Support Equipment (FMSE)?
[ ] Click here to see response options
[ ] Yes
[ ] No

Have you ever encountered problems with the FMSE?
[ ] Click here to see response options
[ ] Yes
[ ] No

Several years ago a prototype system for documentation used a "key" which plugged into an aircraft and extracted all relevant information including the plane's station, tail number, prior fuel usage, etc. The "key" was then plugged into a POL computer to document current fuel requirements and delivery as well as information prior to arrival. Do you have experience with this prototype system?
[ ] Click here to see response options
[ ] Yes
[ ] No
[ ] Don't know / Not applicable

How do you rate the prototype system?
[ ] Click here to see response options
[ ] Much better than current system
[ ] Better than current system
[ ] Same as current system
[ ] Worse than current system
[ ] Much worse than current system

Is the Automatic Tank Gauging (ATG) system for tracking fuel an improvement over previous methods?
[ ] Click here to see response options
[ ] Yes
[ ] No
[ ] Don't know / Not applicable

How difficult is the Fuels Automated System (FAS) interface to use when accessing information?
[ ] Click here to see response options
[ ] Very difficult
[ ] Difficult
[ ] No opinion
[ ] Easy
[ ] Very easy

Do you have any recommendations for improving FAS?
->

With 1 being most serious and 6 being least serious, please rank order the consequences of using JP-8+100.
[ ] Has a limited life
[ ] Requires separate storage facilities
[ ] Requires different filters
[ ] Is not always available
[ ] Adds to accounting (paperwork)
[ ] Other

Which items are delivered via local contractors at deployed locations (check all that apply).
[ ] Aviation fuel
[ ] Oxygen
[ ] Liquid nitrogen
[ ] Heating fuel
[ ] Other (select to enter a response)

Have you had product quality (i.e. fails to meet DoD guidelines) problems with any of the following items (check all that apply)?
[ ] JP8
[ ] JPTS
[ ] Oxygen
[ ] Liquid nitrogen
[ ] Heating fuel
[ ] Other (select to enter a response)

What is the frequency of product quality problems per deployment?
[ ] Click here to see response options
[ ] 1-3 quality problems per deployment
[ ] 4-6
[ ] 7-9
[ ] Over 9
[ ] Don't know / Not applicable

What recommendations would you make to support fuel operations in the year 2005, for a deployed location?
->

Does your job require tracking, documentation, or handling of hazardous materials? (MUST ANSWER)
[ ] Yes
[ ] No

Supply

Do you foresee any problems with consolidating supply and transportation processes (e.g. transportation management office, packing and crating)?
[ ] Click here to see response options
[ ] Yes
[ ] No
[ ] Don't know / Not applicable

Do you understand the importance of time-definite delivery?
[ ] Click here to see response options
[ ] Yes
[ ] No

Is communication between systems such as Standard Base Supply System (SBSS), Air Force Equipment Management System (AFEMS), and Base Contracting Administration System (BCAS) a problem?
[ ] Click here to see response options
[ ] Yes
[ ] No

What is the source of the communication problems between systems (check all that apply)?
[ ] Identifying and resolving discrepancies/inconsistencies
[ ] Access to one of these systems
[ ] Other (select to enter a response)

Do you require In-Transit Visibility (ITV)?
[ ] Click here to see response options
[ ] Yes
[ ] No

At what point(s) do you need ITV (check all that apply)?
[ ] Shipping
[ ] Enroute
[ ] Receiving
[ ] Destination
[ ] Other (select to enter a response)

How important is Total Asset Visibility (TAV) to you?
[ ] Click here to see response choices
[ ] Very
[ ] Some
[ ] Little
[ ] None

How many person-hours are required each week to reconcile the delinquent document list (DDL)?
[ ] Click here to see response options
[ ] None
[ ] Less than 1 hour
[ ] 1 hour but less than 5 hours
[ ] 5 hours but less than 10 hours
[ ] 10 hours but less than 20 hours
[ ] More than 20 hours

In your opinion, what is the best way to minimize contributions to the DDL?
->

Can the part turn-in procedure be improved?
[ ] Click here to see response options
[ ] Yes
[ ] No
[ ] Don't know / Not applicable

Has Supply Regionalization improved Mission Capable (MICAP) operations?
[ ] Click here to see response options
[ ] Yes
[ ] No
[ ] Don't know / Not applicable

Has Supply Regionalization improved stock control operations?
[ ] Click here to see response options
[ ] Yes
[ ] No
[ ] Don't know / Not applicable

What recommendations would you make to support supply operations in the year 2005, for a deployed location?
->

Does your job require tracking, documentation, or handling of hazardous materials? (RESPONSE REQUIRED!)
[ ] Yes
[ ] No

Computer Support

With 1 being the most complaints and 9 being the fewest complaints, please rank order the frequency of complaints for the following information systems.

[ ] Air Force Equipment Management System (AFEMS)
[ ] Automatic Tank Gauging (ATG)
[ ] Base Contracting Administration System (BCAS)
[ ] Consolidation Aircraft Maintenance System (CAMS)
[ ] Deployment Management Asset System (DMAS)
[ ] Fuels Automated System (FAS)
[ ] Mission Capable (MICAP)
[ ] Standard Base Supply System (SBSS)
[ ] Supply Asset Tracking System (SATS)

How often do you develop custom programs to meet customer needs?

[ ] Click here to see response options
[ ] Very often
[ ] Often
[ ] About half the time
[ ] Seldom
[ ] Very seldom
[ ] Never

Rate your ability to complete your duties without using a computer?

[ ] Click here to see response options
[ ] Very difficult
[ ] Difficult
[ ] No opinion
[ ] Easy
[ ] Very easy

Can you perform ALL of your job duties without connection to the internet?

[ ] Click here to see response options
[ ] Yes
[ ] No
[ ] Don't know / Not applicable

Rate your ability to complete your duties without using the internet.

[ ] Click here to see response options
[ ] Very difficult
[ ] Difficult
[ ] No opinion
[ ] Easy
[ ] Very easy

Can you perform ALL of your job duties without connection to a network?
[ ] Click here to see response options
[ ] Yes
[ ] No
[ ] Don't know / Not applicable

Rate your ability to complete your duties without connection to a network?
[ ] Click here to see response options
[ ] Very difficult
[ ] Difficult
[ ] No opinion
[ ] Easy
[ ] Very easy

Your job duties typically require which of the following computer resources (check all that apply)?
[ ] Computer
[ ] Internet
[ ] Network
[ ] Other (select to enter a response)

How much time per day do you lose to computer downtime?
[ ] Click here to see response options
[ ] Less than 1/2 hour
[ ] 1/2 but less than 1 hour
[ ] 1 hour but less than 2 hours
[ ] 2 hours but less than 4 hours
[ ] More than 4 hours

With 1 being most often and 5 being least often, please rank order the SOURCE of computer downtime.
[ ] Host computer
[ ] Outside the installation, but not at host computer
[ ] A connection inside the installation, but not in my computer
[ ] My computer
[ ] Don't know / Not applicable

What recommendations would you make to support computer operations in the year 2005, for a deployed location?
->

Does your job require tracking, documentation, or handling of hazardous materials? (MUST ANSWER)
[ ] Yes
[ ] No

HazMat

Reconciling inventories between Depot Maintenance - Hazardous Material Management System (DMHMMS) and Standard Base Supply System (SBSS) can best be described as?

[ ] Click here to see response options
[ ] A very serious problem
[ ] A serious problem
[ ] A problem
[ ] A minor problem
[ ] No problem at all

Survey Complete

Do you have any additional comments or recommendations concerning supply and fuels?

->

Thank you for completing the survey.

Please check this internet site (129.48.133.69) again in late-September to view the preliminary results. A link to the results page has been established on this site.